Engineering Library
JUN 17 1916
UNIV. OF MICH.

Telephony.

THE AMERICAN TELEPHONE JOURNAL

PUBLISHED EVERY SATURDAY.
TELEPHONY PUBLISHING COMPANY.
VOLUME 70, No. 25.

CHICAGO, JUNE 17, 1916.

SINGLE COPIES, 10 CENTS
YEARLY, U. S. A., $3; CANADA, $4;
ALL OTHER COUNTRIES, $5

EDWARD E. CLEMENT

Attorney at Law and Electrical Engineer

PATENTS
TRADEMARKS
COPYRIGHTS

Soliciting, Consultation, Reports, Opinions

Office: McLachlen Building,
700 Tenth St., - Washington, D. C.

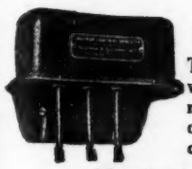
EVERSTICK ANCHORS

You will go around in a circle, if you are looking for a better anchor than the EVERSTICK—there's a reason.

Write for Literature.

Everstick Anchor Co.
St. Louis, Mo.

Chapman Lightning Arresters



are not particular.

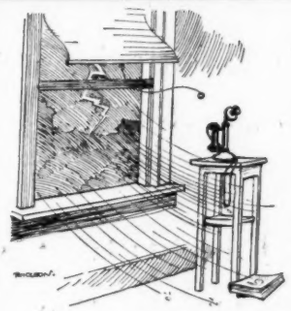
They work equally well in any climate, at sea level or above the clouds.

Manufactured by
MINNESOTA ELECTRIC CO.
MINNEAPOLIS, MINN.

Telephone Cables
ALL SIZES AND CAPACITIES

Hard Drawn Copper Telephone Wire.
Galvanized Iron Telephone Wire.
Siemens-Martin and High Strength Strands.

AMERICAN ELECTRICAL WORKS
PHILLIPSDALE, R. I.
CHICAGO 512 W. Adams St. | CINCINNATI Traction Bldg. | NEW YORK 165 Broadway



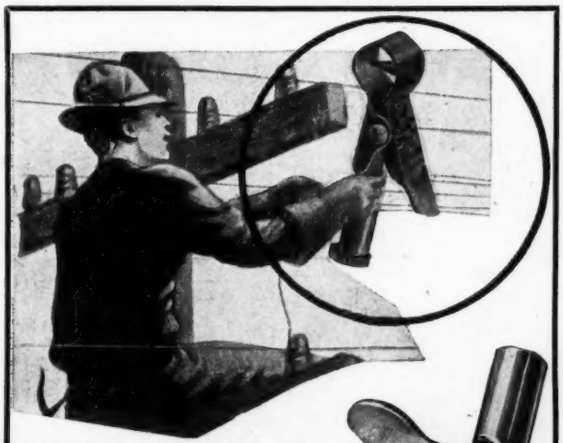
More Work for the Trouble Man

Unless It's a
"RAVEN BRAND"
Moisture Proof Cord

Supply Sales Department

Automatic Electric Co.

Chicago, Ill., U. S. A.
Makers of 600,000 Automatic Telephones
We Have Branches in
New York, N. Y.—46 W. Broadway
Toledo, O.—Second Nat. Bk. Bldg.
Buffalo, N. Y.—332 Ellicott St.
Boston, Mass.—Tremont Bldg.
Detroit, Mich.—Ford Bldg.
Pittsburgh, Pa.—Firt Nat. Bk. Bldg.
Philadelphia, Pa.—Bourse Bldg.
St. Louis, Mo.—Syndicate Trust Bldg.



HOOK UP! In 10 Seconds With a
Frankel Testing Clip

MAKERS OF THE BEST ONLY
FRANKEL
CONNECTOR CO. INC. N.Y.

733 Broadway, NEW YORK CITY
or Western Electric Company, All Branches

American Steel & Wire Co.'s
W. & M.
TELEPHONE WIRE
AMERICAN STEEL & WIRE CO.
Chicago New York Cleveland
Worcester Pittsburgh Denver

CEDAR POLES

Wire or write for delivered prices

NATIONAL POLE CO.
ESCANABA :: :: MICH.

McMEEN and MILLER
(Incorporated)

Samuel G. McMeen
Kempster B. Miller
Leigh S. Keith

TELEPHONE ENGINEERS

1454 Monadnock Block Chicago
407 Electric Building Cleveland

What They Say of "Nokorode" Soldering Paste

"Kindly forward us two cans of Nokorode Soldering Paste. We continue to insist that Nokorode is the only article of the sort manufactured." F. H. OSG, Chf. Ill., Iredell Tel. Co., Weona, Ill.

"Far superior to anything of the kind I have ever used." A. M. BENEDICT, Richards Telephone & Exchange, Richards, Mo.

"I have used Nokorode with good results, especially on Armature work." W. E. SMITH, Virginian Elec. & Mch. Works, Charleston, W. Va.

"We have used a small box of your Nokorode Soldering Paste, which we found satisfactory, and as we expect to use a great deal of same, would like your quotation on this paste in quantities of 5 and 10 gallons." FRANK RENDER, New York, N. Y.

"The best ever." TURNER & BERGRAFF, Elmira, N. Y.

"The best I ever used." G. P. MacNICHOL, Toledo, Ohio.

"One of our customers told us that Nokorode is the only paste with which he could solder metal moulding." AYLSWORTH AGENCIES CO. San Francisco, Cal.

"Entirely satisfactory for our purpose." The McCRUM-HOWELL Co., Racine, Wis.

"I find it more economical and efficient than rosin, acids or any other preparation I use." L. B. McDONALD, New Rochelle, N. Y.

Generous Free Sample on Request.

The M. W. Dunton Co.
Providence, R. I., U. S. A.

Cracraft Leich Service

Have your telephones and parts shipped direct from stock carried for quick service at the following distributing centers:

Cracraft, Leich Electric Company
Main Office and Factory
Genoa, Ill.

Cracraft, Leich Electric Company
Western Branch:
Baltimore and Milwaukee Avenues
Kansas City, Mo.

Electric Appliance Company
Chicago, Ill. Dallas, Texas
New Orleans, La. San Francisco, Calif.

St. Paul Electric Company
316 Robert Street
St. Paul, Minn.

Let us quote you on your Switchboard requirements

Cracraft, Leich Electric Co.

Genoa, Ill. Kansas City, Mo.

Telephony.

THE AMERICAN TELEPHONE JOURNAL

Comprising Telephony, American Telephone Journal, Telephone Weekly, Telephone Magazine, Telephone Securities, The Telephone, Sound Waves

PUBLISHED WEEKLY BY THE TELEPHONY PUBLISHING COMPANY
MONADNOCK BLOCK, CHICAGO

H. B. McMEAL, PRESIDENT AND EDITOR. H. D. FARGO, SECRETARY AND TREASURER. J. C. KELSEY, VICE-PRESIDENT AND FINANCIAL EDITOR.
S. R. EDWARDS, MANAGING EDITOR. J. R. HASTIE, VICE-PRESIDENT AND ADVERTISING MANAGER. W. E. RAYMOND, SUBSCRIPTION MANAGER.

Entered as second-class matter September 4, 1908, at the post office at Chicago, Ill., under act of March 3, 1897

Volume 70
Number 25

CHICAGO, SATURDAY, JUNE 17, 1916

Subscription—10 Cents a Copy
$3 a Year U. S., Cuba and Mexico
$4 Canada; $5 Other Countries

Bill the Troubleman says:

"Some common carriers are trying to delay the enforcement of section 10 of the Clayton act which becomes effective in October. This section requires such corporations to ask for competitive bids on purchases exceeding $50,000 a year. I believe the Interstate Commerce Commission will say 'Nothing doing,' for the very fact that these corporations want a postponement shows it's a pretty good law. Bell Telephone, please note."

A Fault in Commission Control.

State commissions and other official bodies which regulate public utilities should not fail to ponder on the significant point raised in the article contributed to last week's issue of TELEPHONY by L. D. Kellogg. It calls attention to an angle in the Bell-Western Electric situation which probably has escaped the minds of many observers.

That the trend of commission control has been toward a local monopoly—not necessarily Bell, however—of the *operating* telephone business, has been recognized for some time, and the doctrine of "public necessity" has made it increasingly difficult to start a second telephone company in a town. But that this commission control idea has also unintentionally tended to establish a *telephone manufacturing monopoly* is a startling revelation that will strike every fair-minded man as a gross violation of public policy. No doubt members of commissions themselves will be surprised at this allegation, but a casual study of the situation will show that such is the case.

The facts show the Independent telephone interests in a most favorable light, demonstrating that they are buying in a competitive market in a fair, American fashion, while the Bell corporation, as usual, is feeding its Western Electric factory without regard to the rightful demands of honest competition.

The commission control idea contemplates that when a telephone company is efficiently and fairly serving a community, it shall be left in undisturbed possession of the field. If that company is a Bell concern, it buys exclusively from the Western Electric Co. and without seeking bids from other manufacturers. In recognizing the Bell operating unit as having sole right to furnish telephone service in that particular territory, under those conditions, the commission thereby also recognizes the Bell factory as a manufacturing monopoly.

On the other hand, if the telephone operating company is an Independent concern, it buys its telephones, switchboards and other equipment in the open market and seeks bids from all the Independent manufacturers—and many times from the Bell factory, too. That this competitive buying is an excellent thing for the company, and the public it serves, goes without saying. No commission, sincerely seeking to do its duty by the telephone users, will deny that.

No one will contend that the commission control doctrine was intended to foster and build up a monopoly in any manufacturing line. The laws that created public utility commissions never contemplated the purpose of increasing Western Electric sales and "cinching" for that factory the privilege of making all the telephone equipment used in territory in which Bell operating plants have a monopoly. Yet that seems to be the indirect result of commission control in many places. As Mr. Kellogg says:

"If a concern is to receive monopolistic benefits because of its peculiarity that it furnishes a public service, it ought to restrict itself to the enjoyment of those benefits in its public service function, and not use them for a purpose not intended by the legislative body that made the monopoly possible. A monopoly granted for one purpose and used so as to result in a monopoly of a different sort, has been abused, and the whole monopoly ought to be withdrawn until such time as the abuse is proved to have been abated."

This feature of the Bell-Western Electric alliance should be made the subject of a vigorous complaint before the proper authorities. No public utility commission will relish the idea that it is creating a monopoly for the Western Electric Co. It is up to the Independent telephone leaders—manufacturers and operators alike—to bring this matter up before such authorities and insist on the square deal to which they are entitled.

The Watch vs. the Foot-Rule

By HERBERT KAUFMAN

Distance is a Will o' the Wisp—a mirage, an invariable fact and an elastic theory.

Estimates based on spaces are subject to incessant revision, since we discarded the foot-rule for the watch-hand, and measure by minutes instead of miles. Remember that in your calculations or we'll forget you in ours.

If you want to find the shortest route, refer to a clock-dial, not a map. You can get along without an atlas but you can't manage without a time-card.

The earth is steadily shrinking under the pressure of ingenuity. Inventors are gradually squeezing all the continents into one. Your grandfather's geography is ridiculously inaccurate—it told him that the Pacific Ocean was a full three months' journey from the Atlantic Coast, whereas every school-boy knows it's barely a four-day's trip. America used to be six months farther from China, and the earth was so huge in Magellan's century that it took years to sail around it.

Speed is the dominating dimension. Steam, electricity and gasoline have wrought the change. Instant transformation follows upon rapid transportation. Turning wheels and churning screws have condensed the land and drained the sea.

Nature formerly gave certain countries and specific cities peculiar commercial advantages, but the peoples and communities that expect to maintain their position because of propinquity to a given point or port, soon find their natural superiority challenged and frequently discounted, by rivals whom vast stretches of country once held from competition.

Faster ships, better harbors and newer machinery more than overcome the handicap of remoteness.

The Twentieth Century canceled all charters of leadership. Towns can no longer lie back and wait for commerce to put in appearance. Prosperity doesn't "happen" any more. Opportunity doesn't pause at doors with knockers—they're only on out-of-date establishments. She presses bell buttons—they tell the tale.

Old-fashioned ideas won't serve the needs of a new-fangled period. Nor can the men who cling to them. There's no more chance for short-sighted individuals than there is for moss-grown municipalities. Organizations of which you may never hear are including your district in their plans—snatching orders from right under your nose.

They're attacking you with all the arsenals of efficiency; invading your domain via telephone and motor car; piecing out their reach by every available minute-and-penny cutter.

Contractors, states away, can outbid unprogressive local firms, deduct the transport of their equipment and men, and still finish the work on schedule with a heavier profit than builders right on the ground.

Jobbers find the retailer next door dealing on closer terms with catalog houses three days removed and averaging prompter delivery of his orders.

Wake up! Acquire an aeroplane and wireless habit of mind. It's half past hurry o'clock.

Copyright, 1916, by Herbert Kaufman.

"Telephony's" Home Study Course for Telephone Men

A Complete Presentation of the Principles Underlying Modern Telephony in All Its Branches—Arranged Systematically So That Regular Reading and Faithful Study Will Qualify Ambitious Men for Higher Positions—Prepared Under Supervision of Stanley R. Edwards—This Section Written by Jay G. Mitchell

Quiz Questions on the Preceding Installment.

402. What procedure is necessary in studying any circuit? What are given as illustrations?

403. In the analysis of complex circuits what is the procedure?

404. What further conditions must be considered in an analysis of a line circuit?

405. What is meant by marginal operation of switchboard equipment?

406. Give examples of marginal conditions of operation.

407. In circuit analysis what conditions must be considered as regards marginal operation arrangements?

CHAPTER XVIII. Circuit Analysis (Continued).

408. *Analysis of circuit with double wound supervisory relays.*—It is apparent that the operation of the line relay in Fig. 147 will follow the same rule as that of the line relays of the circuits already described. Assuming, therefore, that the line lamp is glowing to indicate the receipt of a call, the conditions in the cord circuit may be studied with the connections as they would be established by the insertion of the answering plug, *M*, into the answering jack. The supervisory lamp circuit is then traceable from the non-grounded terminal of the battery through the wire, 8, to the junction point, 19. From this point, the current will follow two alternative paths—one through the supervisory lamp, *H*, and the other through the resistances, *E* and *I*, in series.

It is to be noted that the two resistances are in series and the combination is in parallel with the lamp. In practice these two resistances are composed of a part of the winding on the spool, a tap for the wire, 16, being taken out at an intermediate point in the winding.

After passing the lamp and resistance in parallel, the circuit may be traced through the relay contact, *O*, the sleeve contact, *S*, of the plug, the sleeve, *S'*, of the jack, and the winding of the cut-off relay, *B*, to the grounded terminal of battery.

It is to be noted that at the point between the resistances, *E* and *I*, a tap is provided to which a wire is connected. Since the assumption is that the plug has but just been inserted in the answering jack, it will be seen that this wire terminates at the armature of the relay, *C*, as the relay is normal, and that it will have no effect upon the operation of the remainder of the equipment.

In order that the supervisory lamp, *H*, may be properly lighted when the plug is inserted in the answering jack, the resistances in circuit with it must not be too high. This requirement fixes the resistance of the winding of the relay, *B*, and, as a matter of fact, the equipment in which this circuit is used makes use of a cut-off relay wound to only 46 ohms.

The resistance of the coils, *E* and *I*, is also fixed by this requirement and by the fact that the shunt around the lamp, *H*, must not be so low as to prevent satisfactorily lighting it. This

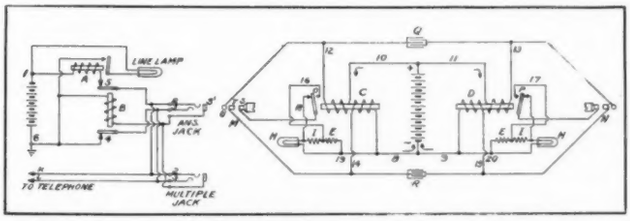


Fig. 147. Circuit With Double-Wound Supervisory Relays.

is a condition that must be provided for in all switchboard circuits arranged to include the supervisory lamps in circuit with the winding of the cut-off relay. It is well worth while, in order to fix this point firmly in mind, to compare, in this respect, the circuit shown in Fig. 143 with the one under consideration.

Since the calling plug, *N*, has not been inserted in the called line jack, a very short examination of the drawing will suffice to show that no circuits for battery current flow have been created other than the one through the cut-off relay and the one out over the calling line still to be traced.

409. *Battery circuit through supervisory relay windings.*—The plug, *M*, has been inserted in the answering jack in response to a lighted line lamp. Therefore, the circuit between the two sides of the line circuit is complete at the calling telephone and the battery circuit to it through the windings of the supervisory relay, *C*, may be traced as follows:

From the wire, 8, to the rear winding of the relay, *C*, then over the wire, 14, to the ring side of the cord and plug at *T* to the ring side of the line at the jack spring, 2; from, 2, out over the ring side of the line, *K*, returning over *L* to the tip spring, 3, the tip of the plug and cord, the wire, 12, the front winding of the relay, *C*, to the grounded terminal of the battery.

The wires leading from the jack springs, 2 and 3, to the line relay, *A*, and the ground terminal of the battery are opened at the cut-off relay contacts, 4 and 5, when *B* responds to the insertion of the plug and cannot introduce any disturbing complications.

410. *The double-wound relay and balanced battery current feed impedances.*—Double-wound relays are used for a variety of purposes in telephone equipment. The circuit shown in Fig. 147 is an illustration of the use of double-wound relays to secure balanced battery current feed impedances. This equality in impedances is obtained by placing two exactly similar wind-

ings, so far as it is possible to obtain them by ordinary manufacturing methods, upon the same iron core. The assumption is that an equal number of turns in each will assure the same impedance, since the magnetic circuit affected by one is supposed to have exactly the same properties as that affected by the other. While this is practically true, it is not strictly so, although the results obtained are satisfactory.

411. *Magnetic effects of coils of double-wound relays.*—The amount of magnetic leakage is not exactly the same for both coils. This has been touched upon in the previous chapter on relay construction. When absolutely balanced impedances are essential, it is necessary to wind two wires, one for each coil, on the core *simultaneously*, so that for each minute portion of the length of one wire there is an exactly similar portion of the other one of the same length and similarly placed in regard to the core.

A very brief inspection of Fig. 147 will show that the current from the battery flows around the relay cores in a direction opposite to that in which the hands of a clock travel, assuming that the observer is looking at the left-hand end of each. Both coils of each relay will, therefore, produce magnetic effects in unison, creating a north magnetic pole at the left-hand end of each of the cores. Should one of the windings be reversed in its connections to the battery and the cord—described in "Practical Talks Just Among Ourselves," TELEPHONY, of May 20—so that the current flows in the opposite direction around the core, the effect of the other winding would be exactly neutralized and the armature of the relay could not be operated.

For this reason it is necessary, in analyzing circuit drawings, to carefully trace out the direction of the current flow around the core of double-wound relays; otherwise, it is impossible to arrive at any sort of an understanding of their operation. This is true because it is often desirable that a double-wound relay shall *not* be operated when current is passing through its windings, but that it shall be operated when the *balance* between the magnetizing effects of the coils is disturbed. Consideration will be given later to a common battery switchboard circuit in which this principle is embodied in the operation of the line equipment.

412. *Direction of current flow in coils of double-wound relays.*—In the cord circuit in Fig. 147, the current in both coils of the supervisory relays *must* flow through them in such a direction as to create magnetic flux in the iron core in the same direction. Therefore, when the external circuit of the tip and ring contacts of the cord is closed, the relay operates its armature. A very useful mental concept of this arrangement is to conceive of the two windings as one winding that has been broken at its middle point and the battery connected to the two inner ends in such a way as to insure that current will always flow around the core in the same direction.

While it is essential for the *operation* of the armature of the double-wound relay that the current in both coils flow around in the same direction, it is just as essential, in case the relay is bridged across the talking circuit for another reason. Disregarding, for the moment, the necessity of supplying current to the telephone transmitters and of providing for positive supervision over the progress of each call toward completion, it will be evident that the winding of both supervisory relays in the circuit shown in Fig. 147 constitutes, in fact, a coil bridged across the transmission circuit. In the case of a single coil wound on an iron core and having a sufficient number of turns, which is bridged across the talking circuit, the inductance reactance prevents a serious loss in transmission by blocking the leakage through it.

413. *Connection of coils of double-wound relay and effect on telephonic transmission.*—Should the effects of the *two* windings of the *double-wound* relay be opposed, one would operate to neutralize the inductance reactance of the other and the high frequency telephonic voice-carrying currents would be seriously diverted from their proper path and would, in fact, escape from one side of the talking circuit to the other. In other words, not only is it necessary to arrange the terminals so that the magnetic effect of each of the windings of the double-wound supervisory relay is the same to secure the *operation* of the relay, but it is also necessary to do so in order that the inductance reactance of the relay be preserved and that transmission loss be prevented.

For this reason all double-wound coils connected between the *two sides of the transmission circuit, for any purpose,* must be most carefully scrutinized, in order that their two windings may not together constitute a *non-inductive* path, causing an avoidable loss in transmission. This should be done *after* the operation of the equipment, from all other standpoints, has been carefully analyzed.

In fact, the possible loss in transmission incurred by the use of any proposed device is the *final test* that must be applied in an analysis of the circuit drawing. *All* connections between the two sides of the transmission circuit must be carefully checked before being finally passed as satisfactory.

(To be Continued.)

Canadian Telephone Statistics for 1913, 1914, and 1915.

The capitalization, cost, revenue, operating expenses, and other data connected with the telephone interests of Canada for 1913, 1914 and 1915, are shown in the following table:

	1913.	1914.	1915.
Capitalization	$59,847,004	$70,291,884	$74,284,991
Cost	$69,214,971	$80,258,356	$83,792,583
Revenue	$14,879,278	$17,297,268	$17,601.672
Operating expenses	$11,175,689	$12,882,402	$12,836,715
Remuneration	$ 6,839,308	$ 8,250,253	$ 8,357,029
Number of telephone companies	1,075	1,136	1,396
Wire mileage	1,092,586	1,343,090	1,452,360
Telephones	463,671	521,144	533,090
Employes	12,867	16,799	15,072
Persons per telephone	16.2	15.5	15.1
Persons per mile of wire	6.8	6.0	5.6

The net earnings of the telephone companies as represented by the difference between total receipts and operating cost, were $4,764,957, an increase of $350,091 over the preceding year.

The following are the different classes of organization: Government, 4; municipal, 62; stock, 584; co-operative, 601; partnership, 28; private, 117; total, 1,396.

In Manitoba and Alberta practically all telephone interests are in the hands of the local governments. In Saskatchewan the provincial goverment operates in all the large centers, but has not taken over the 520 small units that spread their wires over the rural sections of the province. In all the provinces there is a growing tendency toward consolidation.

A Letter Relating to the Western Electric Competition

Letter from Indiana Telephone Man Takes Issue with Statements in Article by Curtis B. Camp Published in Issue of May 13—Mr. Camp in Reply Charges Indiana Company Does Not Buy in Competition

Among the letters which TELEPHONY has received concerning the articles published in recent issues attacking the policies and practices of the Bell company, was one which took issue with the statements made in TELEPHONY of May 13. The letter was received from H. R. Ball, general manager of the Northwestern Indiana Telephone Co., of Valparaiso, Ind. In this letter Mr. Ball took issue with some of the statements made in the article, "Western Electric Sells Independents Inferior Apparatus," by Curtis B. Camp. The letter was referred to Mr. Camp and his reply is as follows:

"In connection with the letter purporting to be written by H. R. Ball, general manager of the Northwestern Indiana Telephone Co., in which he criticises the article written by me and appearing in the May 13 issue of TELEPHONY, I wish to submit the following:

In the first place I do not believe this letter, purporting to have been written by Mr. Ball, was written by him, but that it was written by someone higher up in the Bell organization, to be used in reply to the articles appearing in TELEPHONY. I believe the facts which I shall submit will convince your readers that the letter emanated from the Bell interests. I cannot believe that Mr. Ball or anyone in an operating exchange, such as the Northwestern Indiana Telephone Co., would have made the statement that occurs in the beginning of this letter, in an effort to divert suspicion from the Bell company. Anyone in Mr. Ball's position, if left to himself, would have known that the statement could be and probably would be easily disproven.

The letter purports to be written by Mr. Ball and is signed by him as general manager of the Northwestern Indiana Telephone Co., of Valparaiso, Ind., and is supposed to be a protest from a *bona fide* Independent telephone company against the articles in TELEPHONY with reference to the Bell-Western Electric combination. Of course, the arguments contained in this letter, and the protest as a whole, fall flat, unless the Northwestern Indiana Telephone Co. is a *bona fide* Independent telephone company.

The writer of the letter fully realized this, and in order to qualify along this line, he put a very positive statement in the very beginning of his letter to this effect; that is, as an introduction to his protest, the writer of the letter says: 'The company with which I am associated is strictly an Independent company and we purchase all materials in competition.'

He then proceeds to state his belief that the Western Electric Co. manufactures the most efficient apparatus. He believes the devil should have his dues and he takes exception to the articles appearing in TELEPHONY. But please note the positiveness of his qualifying statement. He says his company is *strictly* an Independent company, and that it purchases *all material in competition.*

Now the Northwestern Indiana Telephone Co. is a good sized company; that is, it has outstanding $100,000 of common stock and $66,800 of preferred stock, and operates exchanges in nine different towns in Indiana.

If the Northwestern Indiana Telephone Co. 'is strictly an Independent company and purchases all its material in competition,' as this letter signed by Mr. Ball states, some of the Independent manufacturers of telephone apparatus would have some record of sales made to this company, or some record of some opportunities that have been given to them at some time or other, to bid upon the requirements of the Northwestern Indiana Telephone Co.

We have taken the pains to write to the Independent manufacturing companies, of which there are not very many. In their replies, they say that the Northern Indiana Telephone Co. does *not* buy its telephone apparatus in competition, and furthermore, that *it does not even give them an opportunity to bid upon its requirements.*

The replies received from the Independent manufacturers of the country, copies of which I submit with this letter, show that this quotation from the letter signed by Mr. Ball, is incorrect. They show that his company is *not* 'strictly an Independent company,' and that it does *not* 'purchase all of its telephone apparatus and material in competition.' It is, in fact and in truth, strictly a Bell company, so far as the purchase of its apparatus is concerned. Apparently the correct statement would be that 'it does *not* purchase *any* of its telephone switchboards and apparatus in competition.'

Accordingly, any of the arguments contained in Mr. Ball's letter criticising the articles appearing in your magazine, are entitled to no weight, because they do not come from an Independent company that has the Independent interests at heart. On the contrary, they may be regarded as coming directly from such a source as the Chicago Telephone Co. or some other similar Bell source.

I quote briefly from the letters of the various Independent manufacturing companies in reply to an inquiry from me as to whether the Northwestern Indiana Telephone Co., of Valparaiso, Ind., ever purchased any telephone apparatus from them.

THE GARFORD MANUFACTURING CO.

We have sold nothing to Valpariso, Ind., for at least a year or two. Somewhere around a year ago, we had an inquiry for quotations on telephones, and we followed it up without results, but we have not had one stitch of correspondence for practically twelve months.

THE STROMBERG-CARLSON TELEPHONE MFG. CO.

The only transaction we have any record of with this company at the Chicago office, occurred in October, 1913. This transaction covered the repairing of one Stromberg-Carlson transmitter.

We have no record of this company ever having asked us to bid on its requirements for telephones or general supplies.

CRACRAFT, LEICH ELECTRIC CO.

The extent of our correspondence with these people is limited to a few letters in October, 1915, regarding our frequency converters and an order for one of these machines.

We have never sold Mr. Ball any regular telephone equipment nor has he ever asked us to quote prices.

MONARCH TELEPHONE MFG. CO.

Upon receipt of your letter dated May 17, we went through our records in an effort to find an order or a letter from the Northwestern Indiana Telephone Co. of Valparaiso. We have never received an inquiry from this concern and, in fact, have never had a communication of any kind from them.

CENTURY TELEPHONE CONSTRUCTION CO.

The name of the Northwestern Indiana Telephone Co., Valparaiso, Indiana, H. R. Ball, general manager, does not appear on our books, nor does it appear that we have had any correspondence requesting bids or quotations on requirements for this company.

SWEDISH-AMERICAN TELEPHONE CO.

Our records do not show that we have ever sold Mr. Ball, or his company, any equipment, nor have we ever had any request from him to bid on his requirements.

AMERICAN ELECTRIC CO.

We have not done any business with this company, nor have we ever received an inquiry from it for prices on any materials. It is our impression that for some time it has been a Bell sublicensee company.

KELLOGG SWITCHBOARD & SUPPLY CO.

The total amount of telephone and switchboard business se-

cured from the above company is limited to the sale of one sample transmitter.

A Western Electric common battery switchboard was purchased by this company in 1912. We were not allowed to bid on this board, nor have we ever been allowed to bid on any of its switchboard requirements.

All of the exchanges of the Northwestern Indiana Telephone Co. are equipped with manual apparatus, so Mr. Ball could not have bought his switchboards and telephone apparatus from the Automatic Electric Co.

The foregoing comprises the entire list of the Independent manufacturers who manufacture common battery apparatus, and you will note that none of them have ever sold or been given an opportunity to sell telephone apparatus to the Valparaiso company.

You will note also one of these manufacturers expresses the opinion that

you will probably find that Mr. Ball is hired by the Western Electric Co. and is simply making his howl as part of his regular duties. We would like to see you show up a lot of these so-called "Independent" men.

There are similar expressions in some of the other replies, and we must admit that the foregoing letters look like it. At the close of the letter signed by Mr. Ball, is the statement:

'If you deem it advisable to attack the Western Electric Co., or any other corporation, that is your privilege, but you should confine your articles to facts, not fiction.'

In view of the foregoing correspondence, I leave it to the readers to judge who is writing fiction and dodging the facts, TELEPHONY or Mr. Ball."

Justified Prejudice.

By B. Franklin Oneliner.

We are reading a great deal of late
* * *
About the Bell-Western Electric combination
* * *
Selling equipment to Independents.
* * *
It is the almost unanimous opinion of Independents
* * *
That this is morally and legally wrong.
* * *
The plans under way to fight the Trust
* * *
May succeed.
* * *
There is reason for doubt.
* * *
There are two parties to every sale—
* * *
The buyer as well as the seller.
* * *
A campaign of education
* * *
For the benefit of the buyer
* * *
Will do more to prevent these sales
* * *
Than any fight on this
* * *
Operating, manufacturing, salesman combination.
* * *
I would like to ask if there are any men
* * *
Entirely familiar with the history
* * *
Of Independent telephony
* * *
Who would buy equipment from a Bell-owned company?
* * *
I hope not!
* * *
This may be prejudice,
* * *
But leave it to any honest man
* * *
If it is not justified!
* * *
Lest we forget,
* * *
Review the history of the telephone industry
* * *
For the past 15 or 20 years.
* * *
Many companies had to fight for their very existence.
* * *
And many were crushed.
* * *
Have we forgotten Paul Latske's story,
* * *
"The Fight with an Octopus?"
* * *
The Bell trust is well organized,
* * *
And has plenty of capital.
* * *
It does not hesitate to use unlimited money
* * *
To buy Independent plants.
* * *
Competition must be crushed!
* * *
Its commercial agents and attorneys
* * *
Have overlooked no opportunity
* * *
To destroy an Independent competitor.
* * *
Years ago, they would sell no apparatus to Independents.
* * *
No! They thought Independents could not compete
* * *
With their switchboards and telephones.
* * *
Now they appear as salesmen
* * *
With a side line for Independents.
* * *
And try to put our manufacturers out of business.
* * *
Are we going to help them succeed?
* * *
Mr. Independent Buyer, have you no sense of justice?
* * *
Think of the Western Electric selling at a loss
* * *
To keep up this fight!
* * *
Is it done to help Independent telephony,
* * *
Which they are spending millions
* * *
To destroy? Hardly.
* * *
Mr. Independent Buyer,
* * *
The very least you can do for the cause of justice
* * *
Is to line up with The Independents!

Efficiency in the Use of the Telephone.

As a result of the general movement for telephone efficiency, the crisp, though not always courteous or dignified, telephonic salutation "hello" is rapidly being eliminated from the vocabulary of large business houses, among which may be mentioned the New York Edison Co. This company has banished the "hello" forever, and in place of it has adopted a new form of response, in which the person answering a telephone call must first state the name of the office or bureau in which the call is received, followed by the name of the person talking. The party calling then knows immediately whether he is connected with the desired department or person.

By means of a series of lectures, the New York Edison Co. has undertaken the work of educating its operators and other employes in telephone efficiency. Particular emphasis is laid upon the necessity of courtesy and accuracy in answering questions or referring calls to the proper individuals. The matter of voice is also touched upon, and a pleasant, easy conversational tone with a rising inflection, although not of too much volume, is urged.

New Telephone Exchange Cut Into Service in Waco, Texas

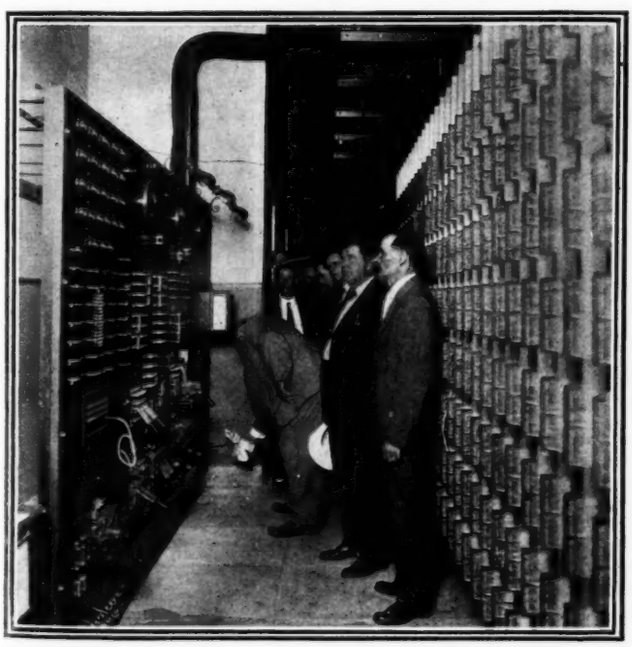
Cut-Over of New Waco Exchange of the Texas Telephone Company Marks the Consolidation of the Bell and Independent Plants in That City—Reception on Roof Garden of Telephone Building Attended by Prominent Guests

Surrounded by the members of the city commission, the officers of the local business organizations and representatives of the press, at 10 o'clock, Saturday night, June 10, Mayor John Dollins of Waco closed the main switch of the new exchange of the Texas Telephone Co. in Waco and cut over the company's system to the new plant, completing work of installation in progress during the last eight months.

The occasion of the cut-over was made a special celebration by the company, marking, as it does, the consolidation of Waco's two telephone exchanges into the one plant operated by the Texas Telephone Co. The exchange of the Southwestern Telegraph & Telephone Co. in Waco is being taken over by the Texas company. The cut-over Saturday night was from the latter company's old plant to its new exchange; the Southwestern non-duplicate telephones will be cut over within a week or so. In the meantime, trunking service is being furnished between the two exchanges.

For the company's reception Saturday night there were present Mayor and Mrs. Dollins, the city commissioners with their wives, and officers of the Waco Chamber of Commerce, Young Men's Business League, McLennan County Medical Society, Waco Ad Club, Rotary Club, Waco Cotton Palace, and representatives of the local press, with their ladies. The guests were shown through the company's new building, which consists of three stories and the basement. The exchange is of fireproof construction and has a roof garden. After the ceremonies attendant upon the closing, by the mayor, of the main switch, the party was invited to the roof garden.

Talks complimentary to the Texas Telephone Co. were



Mayor Closes Switch Cutting New Waco Exchange Into Service.

made by a number of the prominent guests, emphasis being given by all to the completeness of the arrangements in the new building for the care and comfort of the employes, and to the broad-minded policies of the Texas company in its dealings with the public.

"I pledge my official co-operation to a public service corporation so deserving as this one is," said Mayor Dollins, "for it shows a willingness to co-operate with the city, with the people, and with its employes, and under its present management I am sure no city in Texas or

Reception on Roof Garden of New Waco Telephone Building.

the Southwest will have better or more satisfactory service than Waco."

Representing the Rotary Club, President B. C. Nettles of that organization said: "It is a pleasure indeed to have in one's own town a corporation that so truly and well typifies the spirit of our own Rotary organization, that 'He who serves best, profits most.'"

Toastmaster James Hays Quarles, of the Waco Tribune, complimented the company upon the attitude of frankness it had always shown toward the press.

Responding to the addresses for the telephone company, E. C. Blomeyer, who was in charge of the entertainment in the absence of President J. B. Earle, said: "It is gratifying, indeed, that we should have with us tonight, to participate with us in this most important event in the history of our company, such a representative gathering of the citizens of our home town. No corporation has ever dwelt among friendlier people than has this one, and, while the Texas Telephone Co. has, we think, many things to be proud of, it is the proudest of its friends."

Mayor Dollins, who weighs 315 pounds, and is very popular in his home city, laughed heartily when Mr. Blomeyer added: "Now, you've all seen Mayor Dollins close the switch that started this new plant in operation. I wish you newspaper men would announce to everyone that if they have any trouble with their telephones in the next day or two, they should blame Mayor Dollins, because he's the man that started it."

After lunch and speaking on the roof garden, the guests were taken to the operating room, where the new switchboard was observed in operation.

To the officials and employes of the telephone company, a disappointing feature was the fact that President J. B. Earle, of the company, was unable to be present, being quite ill and confined to his home. That Mr. Earle should have to miss the climax of his labors of years was, to his friends and employes, a particularly unfortunate circumstance, and one much regretted by all present.

The Texas Telephone Co. operates a large system, with Waco as the center and headquarters. Ben C. Hyde, of Kansas City, is vice-president of the company, and L. S. Gardner, of Waco, secretary and treasurer. H. E. Kepler is general superintendent; Will Green, chief engineer; H.

B. Wagner, traffic superintendent, and Ben C. Moulden is manager of the Waco exchange. The company is incorporated for $2,000,000, and will operate something more than 6,000 telephones in Waco, which is a city of about 50,000. The company is affiliated with the Gary System.

A. I. E. E. Annual Convention at Cleveland, Ohio.

The 33rd annual convention of the American Institute of Electrical Engineers will be held at the Hollenden Hotel, Cleveland, Ohio, June 27 to 30. The convention committee and its various sub-committees have been actively engaged in formulating plans for the coming convention, which are now completed.

There will be five technical sessions, and numerous entertainment features which will make the convention both profitable and enjoyable to all who attend.

A Growing Kansas Company.

The Bennington Telephone Exchange, of which M. Shepard is proprietor, commenced operations in 1900 at Bennington, Kan., with 75 subscribers. At that time no rural lines had been built in that part of Kansas, the Bennington plant being the pioneer. The exchange was considered an experiment, but in a short time proved a great benefit to the rural communities.

The Bennington lines soon extended to adjoining communities, and exchanges were established at Verdi, Wells and Lindsey. However, the system is operated as a whole, giving free service to all subscribers to all of its different exchanges, Bennington being the main office. At present there are about 700 telephones in the entire system. The Bennington office has 100 city subscribers and 200 rural; the Lindsey office has 10 city subscribers and 32 rural; the Wells office has 20 city subscribers and 70 rural; the Manchester office has 51 city subscribers and 53 rural; the Vine office has 5 city subscribers and 30 rural, and the Niles office has 33 city subscribers and 106 rural.

Kellogg switchboards are used at all offices excepting Wells, where a board of American Electric manufacture is used.

In April, 1912, the Bennington office was completely destroyed by fire. A new home was erected at once and was occupied by August. The new building, a photograph of which is reproduced in the accompanying illustration, is made of brick and cement and is 18 by 36 ft. in length.

The building proper is divided into two rooms, 18 ft. square. The front room is used for the operating room, office and bookkeeping department, while the rear room is for the night operator. The entire basement is used for a work shop and storeroom.

The Bennington exchange is strictly Independent and has extensive toll connections.

New Home of the Bennington Telephone Co., of Bennington, Kan.

New Telephone Exchange for Cleveland Heights.

Work has been commenced on the new Fairmont exchange of the Cleveland Telephone Co., on the southeast corner of Cedar avenue and Edgewood road, Cleveland Heights, Ohio. The building will be two stories in height and will have an 82-foot frontage and a depth of 81 feet. The plant when completed will represent an investment of $500,000.

Meeting of Southern Indiana Independent Association.

An interesting program has been prepared for the quarterly meeting of the Southern Indiana Independent Telephone Owners' Association, which is to be held at Seymour, Ind., on Tuesday, June 20. The meeting will be called to order at 10 a. m. in the Majestic Theater building. The address of welcome will be made by John A. Ross, mayor of Seymour, with the response by William A. Wallace, of Washington, Ind.

The feature of the morning's session will be an address on "Commission Regulation," by Thomas Duncan, chairman of the Indiana Public Service Commission.

After the adjournment of the morning session, the members of the association will be the guests of the Seymour Mutual Telephone Co. at lunch, followed by an automobile ride.

At the afternoon session a paper will be presented by M. F. Hosea, traffic superintendent of the Indianapolis Telephone Co., on "Toll Line Construction and Circuit Arrangement and Service." "Accounting—Including Proper Methods of Making State and Federal Reports," will be taken up by John W. Coffey, of the Coffey System & Audit Co., of Indianapolis, with a discussion by W. M. Brown, general auditor of the Central Home Telephone & Telegraph Co., of Louisville, Ky.

The remainder of the afternoon will be devoted to a round table discussion.

A good attendance of members of the 30-odd associated companies is assured. L. C. Griffitts, president of the Seymour Mutual Telephone Co., cordially invites all those who do not have to leave on early trains to go on an automobile ride, to be the guests of the company for dinner at 6 o'clock, and to make up a theater party in the evening.

Passing June

Telephone Stability—Other Matters

By J. C. Keisey

Owatonna is a Minnesota city and has ever been loyal to the Bell interests. It has steadfastly refused to allow a second company to come in and seemingly enjoyed its monopolistic chains. It would not even allow the second company, the Tri-State Telephone & Telegraph Co., to put in a long distance booth. Its citizens were consciously happy in the thought that it had done its duty.

A year ago, it began to dawn upon the citizens of Owatonna that they were possibly mistaken. It began to creep into their contented minds that a second long distance company was something like a second railway system.

The city always welcomed a new railroad because it brought new business to the town. Likewise the thought finally drove home to the brain of this beautiful Minnesota city that a second long distance telephone company would offer advantages.

It accordingly invited the second company to install about 20 toll terminal stations. But after a while, the business man found he was getting calls over the second line, and was compelled to go to a pay station and wait until the call was completed.

This, he found, wasted time as well as money, so he began to seek a remedy. Accordingly, the city commenced proceedings to compel the local Bell exchange to connect with both toll lines entering the city.

In other words, it was a suit for compulsory physical connection.

The city of Owatonna was always partial to the Bell company—please observe how it has been rewarded for its fidelity. The city has believed in monopoly, and note, if you please, it has to go to commission and court for a privilege which a neighboring city, that never believed in the universal Bell song, has.

Rochester is the neighboring city and happened to be an Independent telephone plant, for Rochester never could see the Bell viewpoint. Hence the Independent plant prospered and the Bell company was glad to move out and connect its long distance lines to the Rochester switchboard.

The Tri-State lines, being Independent, were already in connection, but the Bell interests, governed by necessity, had no choice but to connect with the same switchboard.

Now compare the lot of the Rochester citizen, who never could see the Bell company, to the lot of the Owatonna citizen, who never could see the Independent side. The Rochester citizen calls up and is given connection to any subscriber on the Independent Tri-State system, and to any Bell subscriber in America. The Owatonna citizen can do the same thing—if he will leave his business or walk down town at night.

The Bell company, having a monopoly at Owatonna, is quite willing to allow an Owatonna subscriber to have connection with an Independent toll line—if he will pay 25 cents for the privilege. The Independent company, having a monopoly at Rochester, gives the Rochester subscriber connections with all toll lines without charge.

There never was a greater case of discrimination than now exists and will exist at Owatonna if physical connection is denied.

But the case runs true to human nature. We hear a great deal about the joy and economy of a natural telephone monopoly.

Owatonna fell for the siren song, surrendered itself to the bosom of monopoly and awakes, only to find that it has taken a serpent to its bosom. Rochester did not fall for this seductive song, and today has every privilege that can be asked for.

The case surely offers a lesson to every man who thinks occasionally.

The interesting and astonishing feature of the case was the Bell testimony. If you would believe the Bell witnesses, the toll business which they now enjoy, would fade away and become as nothing.

If you would listen to their song, you would believe that the telephone business is as fickle as a sixteen-year-old girl. You would believe that the work and habits of years would be swept away in a day. You would have to believe that such items as good will and going value have no value at all.

Worst of all, a new man could come in your town, build an exchange, and take every subscriber you have.

If all this is true, then no telephone security—Bell or Independent—is any more than a scrap of paper.

It is not poles, wires, switchboards, and accessories that a telephone company issues bonds and stocks against. The real asset against which every security has been issued since the first day, has been the habit and practice of the telephone subscriber.

Once a subscriber, always a subscriber; and once a toll user, always a toll user. Nothing exists which has proved its stability more than the subscription list of a telephone company. The claims of the Bell company in this instance and every other known one, have been principally moonshine.

But the lesson remains for the world that the Owatonna citizen, in the toils of a Bell monopoly, must either walk to an Independent telephone booth or consent to pay 25 cents for the privilege of getting a connection from his own telephone.

The Rochester citizen, served by an Independent telephone system—a local and not a universal monopoly—gets full and free access to the toll lines of both great long distance companies, and that discriminatory 25-cent piece has never been nor will it ever be mentioned.

Truly this is a fine example of the joys of a monopoly, which is after all a relic of the days of the Inquisition and has no place in the affairs of men today.

Speaking of stability, the proof of which is visible everywhere to Independent and Bell men, I want to call your attention to the Cuban Telephone Co., which operates throughout Cuba.

The Cuban Telephone Co. has had the typical growth which comes so easily and naturally to telephone companies in America.

In 1912, the company had 11,494 telephones.
In 1913, the company had 15,798 telephones.
In 1914, the company had 16,808 telephones.
In 1915, the company had 18,847 telephones.

Now comes a remarkable example of stability of earnings. I doubt if another company in existence can make such a showing in gross earnings.

The New York Telephone Co. (proper) is usually credited with an average earning of $50 per station per year. It must be remembered that the New York Telephone Co. (proper) is a monopoly. It also has gigantic interurban earnings, as one can easily imagine if he puts in calls for people at Jersey City, Newark and countless towns of importance.

Yet the Cuban Telephone Co. has the following record of gross earnings:

1912	$73.72	per station per year.
1913	73.28	per station per year.
1914	71.57	per station per year.
1915	73.00	per station per year.

Observe the natural tendency for gross earnings to decrease as the subscription list increases. Yet in 1915, there was a most gratifying recovery to $73, and another evidence of stability.

Even the Bell interests have reached the bottom line of gross earnings and have turned about. While it amounts to but three cents per station, it should be as pleasing to them as if the last Independent telephone company had died an awful death.

The Bell company gross earnings have operated as follows:

1895	$81.10	per station per year.
1900	57.28	per station per year.
1910	40.75	per station per year.
1913	39.48	per station per year.
1914	38.41	per station per year.
1915	38.45	per station per year.

It is surely pleasing to compare the Cuban Telephone Co. with the typical Bell performances.

With such gross earnings, it is interesting to know the operating costs of the Cuban company for 1915:

Gross earnings	$73.00 per station.
Operating cost	31.79 per station.
Net for operation	$41.21 per station.
Depreciation	9.38
Net for bonds	$31.83
Interest	13.29
Net for stock	$18.54

To compare with the Bell companies, the following Bell table is given:

Gross earnings	$38.45 per station.
Operating cost	30.01 per station.
Net for bonds and stocks	$ 8.44 per station.

It is plain that Cuban Telephone Co. does not suffer in comparison with the great American average.

Speaking of stability, I am further reminded of H. S. Bucher, of Astoria, Ill. Mr. Bucher naturally and justly asked for an increase in telephone rates, and was awarded a $2 business rate, and $1.50 residence rate—single line contracts.

The populace, led by a doctor, was greatly aroused, and an election took place last month whereby a municipal telephone system was voted. In spite of this turmoil, the local telephone company has lost no subscribers and really finds itself stronger than ever before.

The village council has awakened to the fact that they unwittingly played into the hands of a bunch of politicians. Undoubtedly they will put a quietus on the whole proceeding at their next meeting.

The interesting sidelight on the Astoria fight was the startling revelations of a local doctor. The doctor, who uses the roads in pursuit of his practice, claimed that the telephone company imposes upon the people when it charges for telephone service after the people give them use of the roads.

The doctor, however, did not promise to give free medical service for the use of the roads, but the telephone company should do so.

The doctor advanced another novelty. Instead of the telephone company owning an expensive building, it should hire a hall, and cut down expenses. He even objected to a croquet ground in the rear of the exchange because the operators were wasting time there. Further, he claimed that the public utility laws always favor corporations.

All of this was good excitement for the voters, and goes to show that the telephone business is capable of new excitement at any time.

The Owatonna case of compulsory physical connection reveals something of human nature which should be commented upon. When an Independent telephone man gets in the habit of buying Western Electric apparatus, he also gets into the habit of sending all his toll messages over the Bell lines, if he has both long distance telephones.

Many operating companies have failed to sympathize with efforts made to fight the natural manufacturing monopoly ambitions of the Bell interests. Yet if the operator will take the pains to investigate, he will find that the outlying Independent, who has begun to buy Western Electric goods, has ceased to send messages to his exchanges.

This surely places every Independent telephone man—particularly if he has a terminal which has toll lines reaching out into the territory—in the position of being against Western Electric apparatus as radically as all Bell employes are for it.

Did it ever occur to you, Mr. Independent Telephone Man, that the Bell employes all encourage or sell Western Electric apparatus because it takes toll business away from you? It has been hard to understand why some prominent Independent telephone men have never seen the danger of the Western Electric apparatus doctrine.

MORAL: Think it over.

To Extend Telephone Lines in California National Forest.

Local forest officials at Placerville, Cal., are planning the immediate construction of a telephone line in the Georgetown district of the El Dorado national forest, nine miles in length, extending from the Onion Valley to the Hartless ranger station. Another line approximating five miles in length is to be constructed to connect this line directly with Bald Mountain lookout station, where a switch will be installed and direct communication may then be had with all portions of the Georgetown district, as well as to Forest Hill, in the Tahoe forest. The inter-forest telephone line which was built last season is said to have proved a great aid in fire protection work.

Managers J. M. Hughes and M. D. Morris, of the El Dorado forest, will have charge of the construction of these lines. The completion of the Onion Valley-Hartless line will greatly facilitate the work of the forest officers in the administration of the forest, and will be of vital importance in connection with protection work during the coming fire season. This line also completes a circuit of telephone lines over the entire forest, thereby perfecting the forest organization and bringing the district rangers in closer touch with each other.

It is expected that this line will also be a great benefit to the general public, since the forest service allows the public the use of its telephones for transmitting important messages.

Iowa Telephone Co. Increases Capital Stock.

The Iowa Telephone Co. recently filed renewed and amended articles of incorporation with the secretary of state, providing for an increase in capital stock from $10,000,000 to $15,000,000. The corporation will be renewed for a period of 20 years.

Digest of Telephone Articles in Various Publications

Prepared by Arthur Bessey Smith

THE METHODS EMPLOYED FOR THE WIRELESS COMMUNICATION OF SPEECH, by Philip R. Coursey. The Electrician, London, April 7, 1916, pages 7-8.

The writer very briefly treats various methods of generating oscillations which are sustained, so as to be suitable for transmitting the voice. Ordinary arc, Dr. Fleming's "oil-arc," and the other variations are treated. Frequency multipliers receive short attention.

DRY CELLS, by W. R. Cooper. The Electrician, London, March 31, 1916, pages 906-909, and April 7, 1916, pages 19-23; 7 views, 6 curves and 7 tables.

The paper begins with a general description of the dry cell, giving two formulae for the depolarizing mixture, of which the American is as follows:

	Parts.
Manganese peroxide (85 per cent. MnO_2)	100
Ground coke	80
Artificial graphite	20
Sal ammoniac	20
Zinc chloride (30° Bé)	7

Though it would seem that the electrolyte need be only sal ammoniac, zinc chloride is added to reduce local action and

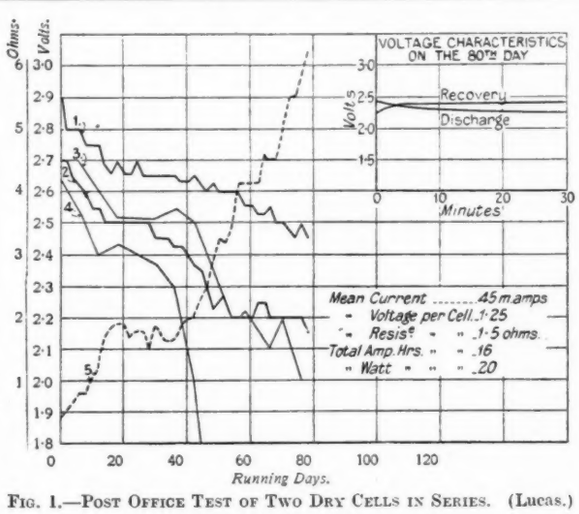


FIG. 1.—POST OFFICE TEST OF TWO DRY CELLS IN SERIES. (Lucas.)

Discharge at 45 m.a. for 5 hours (average) per day.
(5½ hours on five days a week and 2½ hours on Saturdays.)

Curve 1 shows E.M.F. after intervals of rest (*i.e.*, morning readings).
Curve 2 shows E.M.F. immediately after 5½ hours' discharge (*i.e.*, evening readings).
Curve 3 shows E.M.F. after placing battery on 4-ohm circuit for one minute (after interval of rest, taken on Mondays only).
Curve 4 is similar to curve 3, but test was made after period of discharge.
Curve 5 shows mean daily internal resistance as determined by tests before and after each discharge.

drying up. A vent must be provided to let out the ammonia which is generated by action. J. G. Lucas carried out tests to find the effect of allowing the vent to carry away moisture or of preventing the moisture from escaping by connecting the vent to a rubber expansion chamber. Figs. 1 and 2 give the results in favor of sealing.

After a discussion of materials, various desiccated cells are described. These are cells which are specially designed for dry, hot locations in which the ordinary dry cell drys out so rapidly as to become useless. Some of them employ dry salts, others are dry until water is added, and provision made to allow water to be added whenever necessary. Wet and dry cells are then compared as to efficiency regarding useful life and weight, the dry cell being better than the wet.

In testing dry cells, the direct application of the ammeter is condemned as hard on the cell and likely to give erroneous results. Discharge through a suitable resistance is better. Shelf test is slow but yields valuable results, as also do properly made life tests. The latter must conform to conditions of use, and be made upon a considerable number of cells to get a reliable average.

For telephone service the American Electrochemical Society recommends the discharge of three cells in series through 20

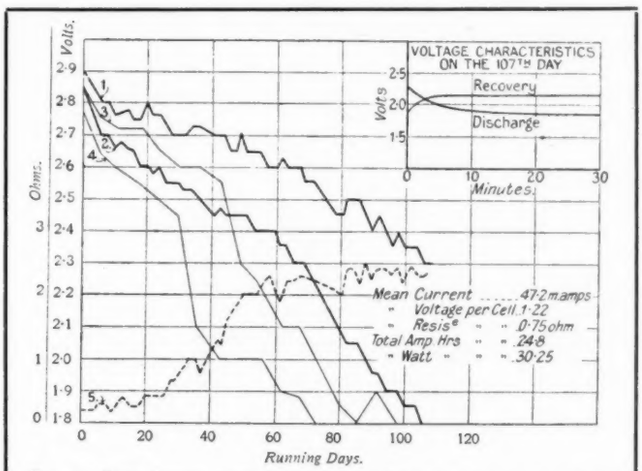


FIG. 2.—POST OFFICE TEST OF TWO DRY CELLS IN SERIES PROVIDED WITH A SEALED EXPANSION CHAMBER. (Lucas.) Compare with Fig. 1.

Discharge at 47·2 m.a. for 5 hours (average) per day.
(5½ hours on five days a week and 2½ hours on Saturdays.)

Curve 1 shows E.M.F. after intervals of rest (*i.e.*, morning readings).
Curve 2 shows E.M.F. immediately after 5½ hours' discharge (*i.e.*, evening readings).
Curve 3 shows E.M.F. after placing battery on 4-ohm circuit for one minute (after interval of rest, taken on Mondays only).
Curve 4 is similar to curve 3, but test was made after period of discharge.
Curve 5 shows mean daily internal resistance as determined by tests before and after each discharge.

ohms for a period of two minutes each hour during 24 hours of the day and seven days in the week until the closed circuit voltage of the battery at the end of the period of contact falls to 2.8 volts, taking the following readings:

Initial open circuit voltage of battery.

Initial closed circuit voltage of battery.

Closed circuit voltage at end of first discharged period.

Closed circuit voltage at the end of a discharged period after three days and weekly thereafter.

The final result is the number of days or hours that the

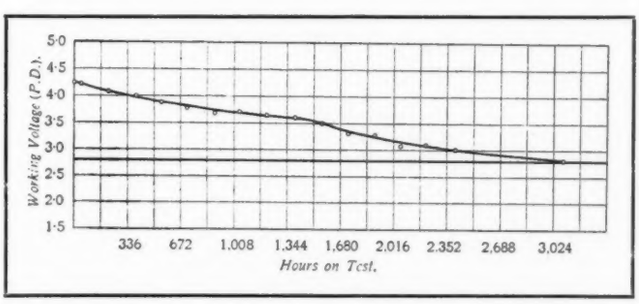


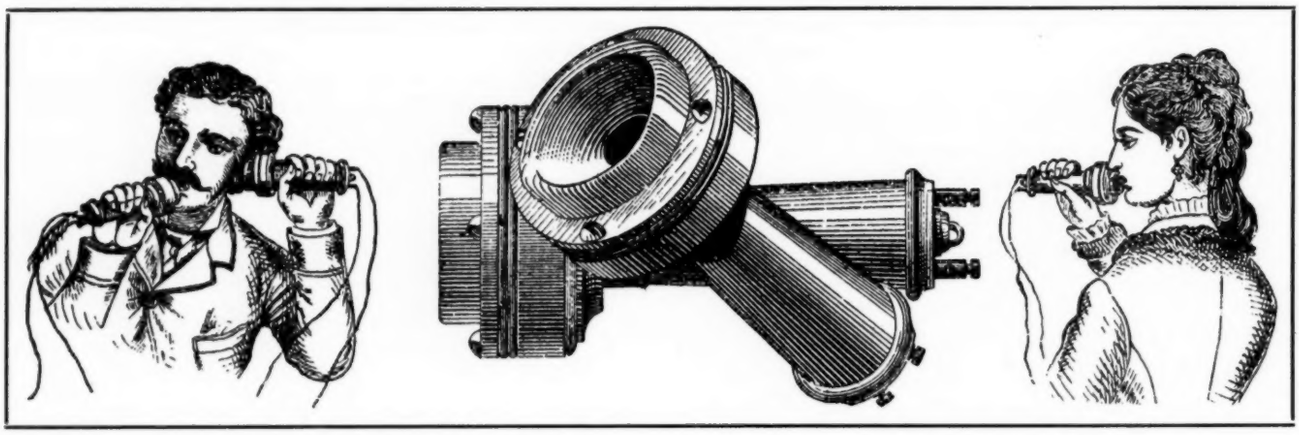
Fig. 13. Representative Discharge Curve on Telephone Test.

closed circuit voltage remains above 2.8 volts. Fig. 13 is a typical record.

THE FIRST INTRODUCTION OF THE TELEPHONE TO THE BRITISH POST OFFICE. Telegraph and Telephone Journal, London. Vol. 2, No. 20, pages 160-162, May, 1916; 5 illustrations.

When the telephone first came to the attention of the British post office people, they thought it was some kind of mul-

tiple telegraph. In March, 1877, the third secretary of the post office directed the engineer-in-chief to report on it, in reply to which he described a harmonic telegraph. September 29 of the same year Col. Reynolds (English representative of Professor Bell) offered to show the telephone to the officials



Wood Block Used to Illustrate the First Telephone Circular Issued by the British Post Office.

to have it used in the telegraph system. The offer was refused because they were afraid the lines were not suitable. In October Fischer and Preece made an able report of the American telephone system, but its adoption was discouraged because induction rendered the lines noisy. Further negotiations resulted in an agreement to rent telephones to the post office at from $25 to $50 per pair per year. A woodcut from the first telephone circular issued by the post office is shown.

A TRAFFIC DEPARTMENT IN THE NEAR EAST, by Florence J. Minter, Telegraph and Telephone Journal, London. Vol. 2, No. 18, pages 117-121. March, 1916; 2 illustrations.

This paper deals with operating conditions in Constantinople before and during the first six months of the war. The telephone exchange was to open February 28, 1914, but free service was given before that date to give the native operators practice. Government officials were almost childish in their anxiety to be among the first to be connected up, and were accordingly favored. Toward the end, when relations were becoming strained, the Turkish government applied drastic measures to secure prompt completion of telephone work. For example, an installer and his assistant had just completed setting the telephone and doing the interior wiring. Then because they did not themselves join up the outside line (which had not yet been strung), they were placed under arrest.

All operators had to speak French and Turkish, using the latter language first, and only employing the French when the subscriber answered in that tongue. The call rate was low, about 3.4 calls per line per day. There are three Sabbaths in the week—Friday the Moslem, Saturday the Jewish, and Sunday the Christian. The directory followed the American practice of putting the number last. The general organization of the company was also along American lines. It is planned to return after the war and carry on the work.

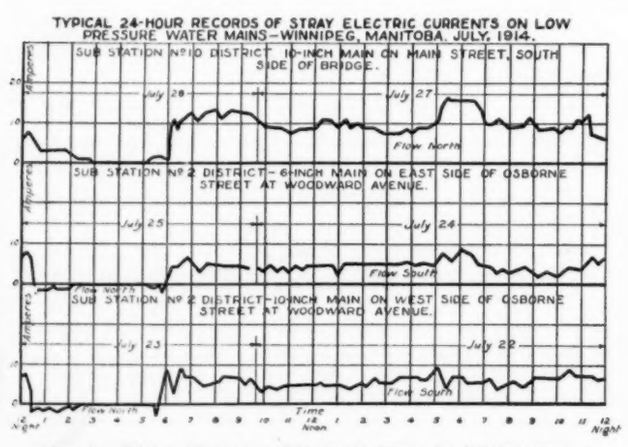

TYPICAL 24-HOUR RECORDS OF STRAY ELECTRIC CURRENTS ON LOW PRESSURE WATER MAINS—WINNIPEG, MANITOBA, JULY, 1914.
SUB STATION Nº 10 DISTRICT 10-INCH MAIN ON MAIN STREET, SOUTH SIDE OF BRIDGE.
July 26
July 27
Flow North
SUB STATION Nº 2 DISTRICT—6INCH MAIN ON EAST SIDE OF OSBORNE STREET AT WOODWARD AVENUE.
July 25
July 24
Flow South
SUB STATION Nº 2 DISTRICT—10INCH MAIN ON WEST SIDE OF OSBORNE STREET AT WOODWARD AVENUE.
July 23
July 22
Flow South
Time

Fig. 4. Three Records of Current Flow on Water Mains.

INVESTIGATION FOR STRAY ELECTRIC CURRENTS IN WINNIPEG, by Albert F. Ganz. Annual Report Manitoba Public Utilities Commission, year ending 1915; 135 pages, 3 curves, 3 views, 5 maps, 11 tables.

This very interesting report contains a number of points which are of interest to telephone men. The city of Winnipeg had suffered quite severely from electrolysis, not only of telephone cables but of water and gas pipes as well. Some structures had been underground somewhat less or more than a year. As a result of the investigation, numerous measures were ordered adopted, among which the following are of interest:

Every rail joint must have a resistance not more than eight feet of rail (very liberal, three feet is often specified). Joint resistances to be tested yearly.

Return feeders (rails to power house) must be insulated from earth.

No bonding from rails to cables or water pipes. The burden of keeping the potential safe is thrown onto the railroad.

Average potential drop along track not to exceed one volt per thousand feet.

Installation of potential wires to read potential at point where return feeder taps onto rails.

Potential readings to be taken monthly to find point of lowest potential in system, followed by a 24-hour record of volt-

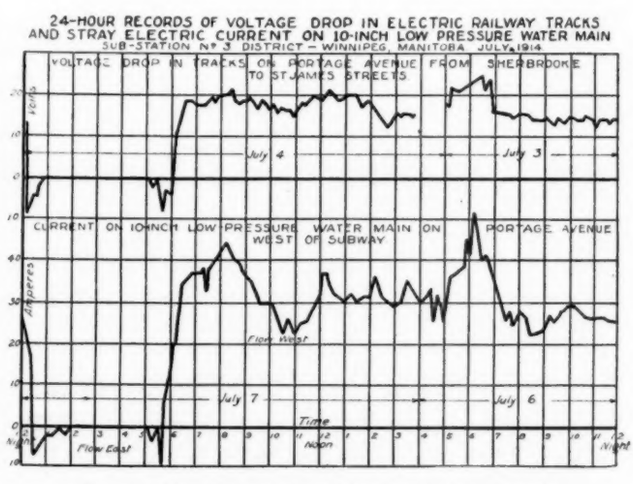

24-HOUR RECORDS OF VOLTAGE DROP IN ELECTRIC RAILWAY TRACKS AND STRAY ELECTRIC CURRENT ON 10-INCH LOW PRESSURE WATER MAIN
SUB-STATION Nº 3 DISTRICT—WINNIPEG, MANITOBA JULY, 1914
VOLTAGE DROP IN TRACKS ON PORTAGE AVENUE FROM SHERBROOKE TO ST JAMES STREETS
July 4
July 3
CURRENT ON 10INCH LOW PRESSURE WATER MAIN ON PORTAGE AVENUE WEST OF SUBWAY
Flow West
July 7
July 6
Time
Flow East

Fig. 5. Voltage Drop and Current Flow Records.

age between feeding limits or city boundary and point of lowest potential.

Ngative bus bar must be insulated. Daily peak load tests must insure its maintenance.

A few drains are permitted, but must have knife switches to permit disconnection and ammeter tests.

The insulated return feeders must be designed with a factor of safety of 1.5.

The cases of the parties interested are presented in the form of briefs.

Professor Ganz, in the body of the report, discusses remedial measures which have been used to reduce electrolysis. The only complete protection is the double trolley system, which is very expensive and not necessary. Stray currents can be controlled to any degree by distributed substations and insulated track return feeders. This does not mean paralleling the rails with copper, but so running the return feeders as to keep the track potential down. The British Board of Trade has a 7-volt limit (drop over all track) but British railroads often keep down to three or five volts. A large 48-inch cast iron water main (proposed) should have three consecutive insulating joints near its crossing under the river.

A very good description is given of the manner in which stray current behaves in leaving the rails and seeking an easy return to the power house by traversing telephone cables and other conductors. One ampere flowing for a year will carry away 20 pounds of iron or 74 pounds of lead. There is no minimum voltage below which electrolysis does not occur. Commercial irons and steels show practically no difference in the mass of metal eaten off in a given time. The oxides of cast iron remain in place but those of wrought iron and steel usually pass to the surrounding soil.

Rapid corrosion from stray current is usually localized, the average being that the current leaves the cable on one per cent. of the exposed surface. Paints and other coatings are ineffective. Drainage may be dangerous if large currents are carried. This is especially true if gas is present. Underground piping is less suitable for drainage than lead cable, because the imperfect joints cause the current to leave the pipe at many points.

With the insulated return feeder system, the power losses to the railroad are larger, but it is a necessary expense and fully warranted to save underground structures.

MAGNETIC TESTING. Circular No. 17, U. S. Bureau of Standards; 50 pages, 12 curves, 3 drawings, 5 diagrams, 1 view, 3 tables, bibliography.

This bulletin is of interest to makers of electrical apparatus and those who are concerned with testing or designing. It begins with the fundamental formulae relating to the magnetization of iron by a current of electricity, and discusses the effects of previous history of the sample, temperature, mechanical vibration, and the grain of rolled sheets. The nature of the "normal induction" and the "hysteresis loop" are clearly described.

The Bureau of Standards is prepared to make the following tests: (1) Normal induction and hysteresis; (2) core loss; (3) susceptibility; (4) permanent magnets; and (5) magnetic apparatus.

Then follow descriptions of the methods of measurement employed by the Bureau, the Burrows permeameter for normal induction and hysteresis, and the Lloyd apparatus for core loss. All measurements are made in the metric system. There is a table of magnetic susceptibilities of non-magnetic materails and a list of other Bureau publications on magnetism.

LEAKAGE OF CURRENTS FROM ELECTRIC RAILWAYS, by McCollum and Logan. Technologic Paper No. 63, U. S. Bureau of Standards; 31 pages, 2 diagrams, 13 curves.

This is a purely mathematical investigation of the very important subject of leakage, which makes itself known to the telephone man in electrolysis of cables. In past years the burden of protection was placed upon the telephone people, upon the theory that the earth is free and the railway cannot be restricted in the use of the dirt as a return conductor. But it is now realized that the users of the earth are partners and cannot be separated; also that electrolysis evils can be handled best by intelligent co-operation.

This paper develops formulæ which show how the various

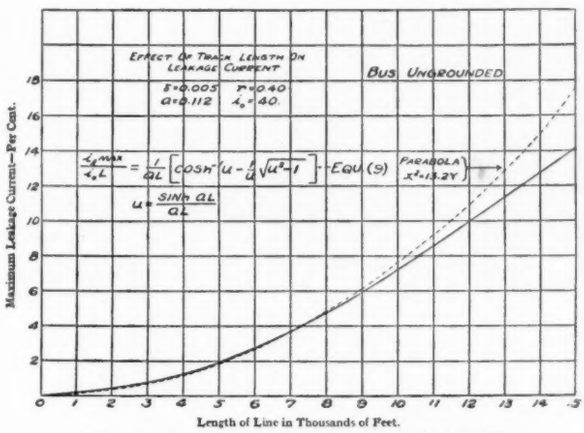


Fig. 4. Leakage Current and Track Length.

factors of bus grounding, track resistance, leakage resistance, etc., affect the leakage of current through the earth. The following are among the deductions:

The effect of track resistance on leakage currents is the inverse of leakage resistance. Roadbeds should be constructed so as to insulate the rails so far as practicable.

Leakage current increases much faster than the length of line (Fig. 4).

The grounding of the negative bus bar at the power house produces greater leakage and more danger to cables.

In the case of very long feeding distances, practically all the current may return to the power house by the earth instead of rails. Feeding distances should be as short as possible.

Low potential gradients and low over all voltages in themselves are not definite indication of good electrolysis conditions.

A relatively small positive area is an indication of severe electrolysis confined to a small region.

MODERN PRACTICE IN THE CONSTRUCTION OF RAIL JOINTS AND BONDS, by E. R. Shepard. Technologic Paper No. 62, U. S. Bureau of Standards; 122 pages, 29 views, 6 drawings, 7 tables.

This rather voluminous paper treats the matter of track joints and rail bonds from the broad view of the railroad, but includes much matter of value to the telephone company. In fact, the study made by the Bureau on electrolysis mitigation caused the importance of good bonding to be appreciated and resulted in the present paper. After briefly rehearsing the history of rail return, the writer enumerates bond requirements and describes types of bonds.

Soldered bonds are losing ground because of the care required to install properly, but this proves to be true of all bonds. An extensive inquiry among many operating railroads as to their experiences with bonds reveals widely divergent results. Low resistance is desired, but the results vary from the equivalent of 1.5 feet to 13 feet of rail. The whole subject is still in the state of evolution. Proper maintenance is a question of support of the joint, for vibration loosens the best joint.

While welded joints are being used more than ever, there is a growing tendency to adopt improved mechanical joints. It has been proved that the saving in power alone will not justify the best modern practice in bonding, but is fully warranted when electrolysis is taken into account. The paper closes with a bibliography.

Proceedings Before Commissions, Courts and Councils

Discussions and Rulings of State Bodies Having Supervision Over Telephone Companies, Decisions of Courts in Matters of Interest to Public Utilities and Actions of City Councils Relative to Franchises, Rates and Service

Hearing Resumed on Washington Telephone Investigation.

The Washington Public Service Commission, on May 31, began its telephone rate hearing at Olympia, Wash., to determine the reasonableness of the rates of the Pacific Telephone & Telegraph Co. in the state. Most of the day was spent in segregating the value of each exchange, finding its net earning and its rate of return. The commission had previously fixed the valuation of the company's property as a whole at $19,000,000. Toll line values were also segregated, A. E. Boyles, telephone expert for the commission, being on the stand most of the day.

It was shown that the air line long distance rates which were put into effect as an experiment two years ago have resulted in financial loss to the company, the revenues having been decreased.

The counsel for the telephone company has practically accepted the commission's segregation of rate bases by waiving objection to them. The difference between the commission's engineering department segregation totals and those of the company engineers are only three-tenths of 1 per cent.

Taking the principal cities and towns of the state, rates will be figured by the public service commission upon the following valuations for various exchanges, which include the local telephone valuation in the city or town named:

Seattle, $6,799,902; Spokane, $3,387,264; Tacoma, $2,425,826; Bellingham $607,370; Walla Walla, $303,600; Everett, $298,212; Centralia, $72,445; Hoquiam, $78,509. The total valuation of toll or long distance lines is fixed at $3,836,133.

Aberdeen joined with Cosmopolis on Friday, June 1, in a complaint made by the latter town against the prevailing arrangement of Grays Harbor rates. T. E. Griffith, mayor of Cosmopolis; W. H. Tucker, city attorney of Aberdeen, and A. C. Gaillac, president of the Aberdeen Chamber of Commerce, testified before the commission in an effort to have the Cosmopolis rate equalized. Aberdeen and Hoquiam have a rate of $1.50 for four-party lines, with connection between the two cities, while Cosmopolis pays $2.50 for ten-party lines working through the Aberdeen exchange The attorneys for the telephone company contended that the Cosmopolis rate is equitable, but that a long distance toll ought to be put into effect between Aberdeen and Hoquiam.

J. McCune, of the Tacoma Chamber of Commerce transportation bureau, testified on a complaint that American Lake telephone patrons were charged $2.50 for ten-party lines, his object being to have the service regulated to four-party lines for the same charge.

A. E. Boyles occupied most of the second day in reading and explaining rate base segregation as offered by the commission.

The hearing came to an abrupt halt Friday morning, June 2, when the commission announced an adjournment to Spokane for June 10.

Suit for Violation of Commission Order.

On complaint of the Wisconsin Railroad Commission, Attorney General Walter C. Owen has started an action to recover $150,000 in penalties from the Door County Telephone Co., of Sturgeon Bay, Wis., for alleged violation of an order of the commission. The papers in the suit have been filed by Deputy Attorney General Walter Drew, who will direct the action.

Fifteen specific accounts for violations are made against the company. In each the maximum penalty of $10,000 each is asked. The first cause alleges that the company failed to establish full metallic circuits as ordered; the second, that it failed to divide its toll line as ordered; the third, that it failed to keep a record of all complaints and irregularities regarding service; the fourth, that it failed to establish a switchboard at Bailey's Harbor as ordered; the fifth and subsequent causes to and including the fifteenth, that it failed to make monthly reports to the commission regarding the progress of construction and work done.

Just recently in a similar action the state recovered $10,000 from the Milwaukee Electric Railway & Light Co. for failure to obey certain service orders of the commission.

"This action means more than is apparent on the face of it," said Deputy Attorney General Drew, who is to conduct the case for the state. "It means that the railroad commission is through temporizing with utilities in the state, who are inclined to play fast and loose with commission orders. It seems that there are some, who are under the impression that the commission is handing down orders because there is nothing much else to do and that these orders are not to be taken seriously; that it is all right to obey if it is convenient. If the orders of the commission are *not* to be enforced then that body might just as well go out of existence. And from what I have heard there is no disposition on the part of any one to dispense with the commission just yet."

Jurisdiction of Michigan Railroad Commission Upheld.

More than ordinary interest is being manifested in Michigan regarding the efforts of the Michigan State Telephone Co. to establish a metered service rate schedule in Detroit. This week the city, through its corporation counsel, made an application to the Michigan Supreme Court asking for a writ of prohibition directed against the state railroad commission to restrain that body from interfering in the settlement of the rate question of telephones as applied to the city of Detroit. The supreme court denied the application of the city and the extended hearing on the rate question proper before the Michigan Railroad Commission will be continued, and perhaps concluded in Detroit on June 20.

The decision of the supreme court clearly defines the question as to whether the state railroad commission has supervision over telephone rates in the state. The city attorneys are not yet sure what steps will be taken next by them, but the indications are that an effort will be made to secure some redress through other channels.

Upholds Refusal of Service for Unlawful Purposes.

A telephone company is justified in refusing service to a person if there is reason to believe that unlawful use will be made of such telephone service, under a ruling by the appellate division of the Supreme Court of New York, on June 2. The court heard an application by William Restmeyer for a writ of mandamus to compel the New York Telephone Co. to furnish him service, and the company replied that the police had complained that Restmeyer, who conducts a saloon, was receiving bets on horse races over the telephone in his place.

Supreme Court Justice Cohalan granted the writ applied for, but the appellate division reversed his ruling and said: "It is certainly not an unlawful or oppressive use of police power to interrupt telephone service by arrangement between the police and the telephone company where the telephone is being used, as it was in this case, to carry on a criminal business."

Although the right of the police to "listen in" on telephone wires was not involved in the case, lawyers who examined the opinion written by Justice Davis expressed the belief that it could be extended to cover "listening in."

It was said that the opinion may have a direct bearing on the controversy between Mayor Mitchel and the Roman Catholic priests whose wires were tapped and also on the wire-tapping indictments in Brooklyn.

Agreement for Consolidation of Dallas, Texas, Plants.

Press announcements were made June 7 by President J. C. Casler, for the Dallas Automatic Telephone Co., and First Vice-President E. D. Nims, for the Southwestern Telegraph & Telephone Co., that an agreement for the consolidation of the two telephone systems in Dallas, Texas, had been reached, and that an application for a franchise for a new company to be formed to take over the two existing telephone plants had been filed with the city commission. By a vote of three to one, that same day, the board of commissioners approved the petition of the telephone companies that they be allowed to merge in Dallas, and took the first steps looking toward a physical valuation of both properties and the preparation of a new franchise that would be mutually satisfactory.

Edward W. Bemis, public utility expert and consulting engineer, has been employed by the city to value the properties, at the expense of the telephone companies. Mr. Bemis has recently completed valuations of and made reports upon other utilities in the city, at an expense to the city of some $20,000. Unofficial estimates of the values of the two exchanges have been given as follows: Automatic plant, $3,500,000, and Southwestern property, $5,500,000.

Representatives of the city have announced that a "service at cost" plan will be followed out should the plans for the merger develop, the city to have complete regulation of the merged plant as to rates, kind of service, and other features. Metered service will likely be supplied if the merger goes through.

The proposition to merge the two systems in Dallas seems to have found favor with the city authorities, with the people and the press. The indications are that, unless some serious disagreement should develop as to rates, or the terms of the new franchise, the merger will have final approval with no delay.

Rules Governing Extension of Telephone Service.

The Dane County Rural Telephone Co., of Madison, recently filed with the Wisconsin Railroad Commission the following rules governing extensions of service:

"Where the cost of pole line and wire plant extension to an applicant subscriber residing within five miles of the exchange, exceeds two years' rental revenue, the excess cost of such extension shall be borne by the applicant. For each additional mile or fraction that the applicant resides from the exchange, a quarter year's rental shall be deducted from the two-year rental period.

Any rental received within two years of its construction from subsequent subscribers added to such extension shall be credited on the original subscriber's rental account provided he has paid an excess construction charge, but such credit shall not exceed such excess construction charge. The company reserves the right to make such extension on its own initiative as the proper development of its territory may in its judgment require."

To Submit Austin (Texas) Merger to Vote of People.

The city council of Austin, Texas, has decided to submit to vote of the people the question of a merger of the Southwestern and Independent telephone exchanges. Considerable opposition has been manifested because of the failure to include a minimum wage provision, the rock on which negotiations split recently and which has been made an issue by the state federation of labor.

Public Utilities Board to Oppose Los Angeles Merger.

The Public Utilities Board of Los Angeles will appear before the California Railroad Commission next month opposing definitely the proposed merger of the Home Telephone & Telegraph Co., of Los Angeles, and the Pacific Telephone & Telegraph Co., in that territory. The board will endeavor to provide that the clause in the Home company's franchise against transfer without authorization of the voters is respected.

This was the announcement made by President Fulton Lane, of the Public Utilities Board, in commenting upon the defeat of the initiative ordinance proposing an issue of $8,000,000 in bonds for a municipal telephone system.

Scope of Right of Way Deed.

A right of way deed of an easement to erect, repair, and maintain a single or double line of poles or towers and wires strung upon them and from pole to pole and from tower to tower for the transmission of electric currents, with all necessary anchors, guys, and braces, recited that in further consideration the company had paid to the owner $5 for each 100 feet of land crossed by the line for a single line of poles, and its agreement to pay for any extra poles set on the land at the same rate. Under this deed it erected towers carrying electric cables with a pole on the top of each tower carrying a single line of wire, and below which were telephone wires from tower to tower supported by weights and bars. One of the grantees acknowledged that the lines as erected were satsifactorily located in accordance with his deed, which he thereby ratified.

The court held that poles placed between each of two towers and a pole between the outside tower, 23 or 24 feet high, carrying the telephone wires were "extra poles," not authorized by the deed, and constituting a trespass entitling the owner to additional compensation. In such case plaintiff could not recover on his action of contract, but, if before the entry of final judgment he moved to amend his action into an action of tort, its disposition would be within the discretion of the superior court. Foster vs. Connecticut River Transmission Co., Supreme Judicial Court of Massachusetts, 112 Northeastern, 226.

Expense of Shifting Cables in Leased Conduit.

A lease of space for electric wires in a municipal conduit system provided that, if the lessor should require, without the consent of the lessee, the latter to shift its cables and wires from one set of ducts to another, one-half of the expense thereof should be borne by the city. The court held that the "expense" includes the cost of additional cable and wires made necessary by enlarging the manholes or changing to another conduit which did not benefit the lessee, even though such cables and wires remained assets of the lessee and part of its physical valuation. Consolidated Gas, Electric Light & Power Co. vs. City Council of Baltimore; Court of Appeals of Maryland; 96 Atlantic, 804.

Rights of a Company Not Affected by Sale of Lease.

The rights of a telephone company, under its contract leasing wires of another company for the transmission of long distance messages, which contract provided that it should be unaffected by sale or transfer of the property, were not affected by the sale, by such other company, to a third, of such leased wires, since they remained subject to the lease, which was not of such a personal character as to be unassignable. The lessee company could not, therefore, as a party in interest under the statute, maintain its suit against the railroad commission to vacate its order approving the sale. Michigan Independent Tele-

phone & Traffic Association vs. Michigan Railroad Commission; Supreme Court of Michigan; 157 Northwestern, 52.

Cannot Enjoin Use of Line in Front of Owner's Premises.

The taking of land by a telephone company for the construction and operation of its line, according to the Supreme Court of Errors of Connecticut (96 A. 966) is not done for private use and an owner cannot enjoin the use of the line in front of his premises unless the damages to be anticipated in the future by the continuance of the line and from the use it will be put to will be irreparable. In a court of equity, it was pointed out, the application of an owner aggrieved by the illegal maintenance of lines in front of his premises will not restrain its use by the company on account of the greater evil of inconvenience to the public that the release to the owner would occasion.

Damages for Interruption of Service.

In the absence of evidence that a telephone company acted recklessly, negligently, or maliciously in removing the plaintiff's telephone and interrupting his service, he cannot recover punitive damages, but is limited to actual damages for annoyance and inconvenience actually suffered. Evidence as to comparative profits before, during and after interruption of telephone service, is admissible under proper safeguards in an action for damages for such interruption. Harbaugh vs. Citizens' Telephone Co.; Supreme Court of Michigan; 157 Northwestern, 32.

Telephone Conversation Admissible in Evidence.

Evidence of a conversation over a telephone is not inadmissible because such communication is uncertain, unreliable and easily manufactured. The great improvement in the means of communication which the telephone has made, its nature, operation, and ordinary uses, are facts of general scientific knowledge of which the courts will take judicial notice as a part of public contemporary history. Heckman vs. Davis; Supreme Court of Oklahome; 155 Pacific, 1,170.

Whether Lineman's Death Was Caused by Shock or Fall.

Where a telephone lineman came in contact with a defectively insulated electric wire, and received a shock, and fell, and was found dead, it was a question for the jury whether the negligence of the electric company was the proximate cause of decendent's death, though it was not shown whether the death was caused by the electric shock or by the fall. Hockenberry vs. New Castle Electric Co.; Supreme Court of Pennsylvania; 96 Atlantic, 1,046.

Injury to Child by Loose Guy Wires.

A boy who was injured by a loose guy wire hanging from a telegraph pole while he was playing on a grass plot alongside the traveled part of a highway was in a place where he had a right to be. Evidence that children had been swinging on a loose guy wire hanging from a telegraph pole the day before the accident is sufficient to warrant the jury in finding that the telegraph company was negligent in failing to discover and secure the guy wire. Fry vs. Postal Telegraph Co., Supreme Judicial Court of Massachusetts, 112 Northeastern, 214.

Conversion of Rejected Poles.

The purchaser of poles at a siding removed all of them except the culls, which he had rejected. He thereafter attempted to sell all the poles owned by him at such siding. Although there was no direct evidence that he had branded remaining poles, the court held that the assertion of ownership was sufficient to create an inference that he did brand them, and to show conversion. Bayley vs. National Pole Co., Supreme Court of Washington, 156 Pacific, 867.

Summary of State Commission Hearings and Rulings.

CALIFORNIA.

June: Joint application filed by the Pacific Telephone & Telegraph Co. and the Sunset Telephone & Telegraph Co. for authority for the Sunset company to sell to the Pacific company all its property and assets in California. The application states that the sale is desirable because the Pacific company is operating all the property of the Sunset company and considers it best that the ownership of the property should be in the corporation which is charged with the responsibility of its management. The consideration of the sale is fixed at $10. The total amount of the capital stock of the Sunset company is $15,000,000, all owned by the Pacific company.

June: The commission authorized the Reedley (Cal.) Telephone Co. to issue 951 shares of its capital stock at $1 par value at not less than 90, to reimburse treasury for moneys expended.

June: The Lindsay Home Telephone & Telegraph Co., of Lindsay, Tulare county, filed with the commission an application for authority to issue $15,000 of 6 per cent. 18-year bonds, at 93, to execute a deed of trust to secure this amount, and to adjust its rates.

June 9: Hearing on application of the Los Angeles Telephone Co. for authority to issue capital stock of the par value of $1,500 to pay a note held by Bank of Los Gatos.

June 27: Hearing in San Diego on application of the Pacific Telephone & Telegraph Co. to have rates established throughout the state.

FLORIDA.

June 27: Hearing to consider charges of discriminations in rates by the Home Telephone Co., of Jacksonville, Fla.

KANSAS.

May 23: The commission granted the application for the approval of the sale of the La Cygne (Kan.) Telephone Co. to the Peoples Mutual Telephone Co., of La Cygne.

June 8: The commission authorized the United Telephone Co., of Abilene, Kan., to purchase the Clay enter (Kan.) Telephone Co. and to issue $71,000 worth of capital stock to secure the necessary funds for making the purchase.

June 8: The commission granted the application of John and Ben Prienheim for permission to sell the telephone plant and property at Cunningham, Kan., to H. D. Doty.

June 8: The Arkansas Valley Telephone Co., of Great Bend, Kan., was authorized to issue $200,000 capital stock for the purpose of paying off outstanding indebtedness and to purchase the property of the Garden City Telephone, Light & Power

June 8: The Wilburton (Kan.) Telephone Co. was granted a certificate of convenience and necessity and was authorized to issue capital stock in the amount of $1,500.

June 14: Hearing on application of the Baxter Telephone Co., of Baxter Springs, Kan., for an increase in rates.

MICHIGAN.

June 20: Continued hearing in Detroit on the petition of the Michigan State Telephone Co. for permission to establish a metered service rate schedule in that city.

MINNESOTA.

June 13: In considering the complaint of the stockholders of the West Concord (Minn.) Farmers Telephone Co. to make an investigation of the affairs of the company and issue an order compelling the payment of a dividend and the complaint of the Mutual Telephone Co., of West Concord, of discriminatory practices of the West Concord Farmers Telephone Co., the commission consolidated them for convenience.

Upon investigation the commission found that the West Concord Farmers company is incorporated with a capital stock of $14,900; that it was organized in 1909 and that it serves a total of 321 subscribers. An inspection of the plant revealed a low class of maintenance. The plant has been allowed to deteriorate so that good service cannot be rendered and a large expenditure will be required to place it in first class condition. In 1911 and 1912 the company paid a 6 per cent. dividend; in 1913, 15 per cent. and none in 1914. Early in 1914 a number of the stockholders became dissatisfied with the management and organized and placed in operation the Mutual Telephone Co., of West Concord. This company serves about 378 subscribers and covers practically the same territory as that served by the West Concord company. The construction is of the latest type and first class in every particular.

Since the new company was formed, the commission found that the business of the West Concord company has constantly diminished and that on July 1, 1915, the number of telephones has diminished to 295, whereas on April 30, 1913, it had 499 subscribers. The commission also found that in the year 1913, at which time the 15 per cent. dividend was paid, the company's disbursements actually exceeded the receipts from op-

No free rental service was found to have been given to subscribers.

The Minnesota law provides that the directors of a company shall "declare such dividends of the profits of the business as they deem advisable, but shall not thereby reduce the capital while there are outstanding liabilities." In the absence of authority to compel a company to declare a dividend, the commission denied the request for such an order.

The Mutual Telephone Co., of West Concord, produced evidence to show that the West Concord company, its competitor, is giving its subscribers free service on toll messages from West Concord to Pine Island, while the Pine Island company is charging its subscribers 10 cents per message from Pine Island to West Concord. The toll service between the two points is over a line jointly owned, the Pine Island company owning seven miles of line and the other two companies each owning seven miles of line which connect with the line of the first-mentioned company. The subscribers of the Mutual company are likewise required to pay a toll charge of 10 cents for each message to Pine Island. The Minnesota commission has heretofore ruled that the same rate must be charged for toll messages in both directions, and accordingly ordered the West Concord company to assess a toll charge of 10 cents on messages to Pine Island.

June 27: Hearing at Moose Lake, Minn., on the application of the Tri-State Telephone & Telegraph Co. to increase its local exchange rates in that city. The community, it is alleged, desires continuous day, night and Sunday service, instead of the present day and limited Sunday service. In order to furnish the additional service, the company asks permission to increase the single line business rate from $1.50 per month to $2 and the single line residence rate from $1.25 to $1.50 per month, other rates to remain as at present.

June 29: Hearing in the case of the Commercial Club of Lake City vs. the Northwestern Telephone Exchange Co. and the Tri-State Telephone & Telegraph Co., relative to a reduction in the toll rate between Lake City and the Twin Cities.

June 30: Hearing in the matter of the application of the Star Telephone Co., Farmington, Minn., to increase its local exchange rates at Farmington, Lakeville, Rosemount, Mendota, Prior Lake, New Market, Webster, Lonsdale and Northfield.

MISSOURI.

September 18: Hearing in the matter of adopting a uniform system of accounts for telephone companies. Every telephone company in the state has been given notice that it will be expected to be present or to be represented, and to introduce any evidence necessary to assist in the promulgating of a uniform system of accounts for telephone companies. Case 937.

September 18: General conference in which representatives of all telephone companies in the state are to meet with the commission and to introduce all testimony and evidence required in the adoption of uniform rules, regulations and practices for telephone companies, relative to all charges, deposits, contracts, or guarantees for all kinds of service and connections. Case 938.

NEBRASKA.

June: In response to a request for further particulars as to what patrons of the Lincoln Telephone & Telegraph Co. at Fairbury had been led by alleged misrepresentations to agree to an increase of rates, J. C. Hartigan, representing the protestants, has filed with the railway commission a new protest. The complainants ask for an injunction to prohibit the Lincoln company from removing any more telephones and to compel the company to connect up those heretofore disconnected. It is alleged by the complainants that the company operates 42 lines, on which there are from six to eleven subscribers each; that the Lincoln company bought the Fairbury Telephone Co.'s property, which had 12 years before contracted with subscribers to give service for $1.25 a month. It is alleged the Lincoln company now asks $1.50 a month. It is further alleged that when the farm lines were in bad condition in 1915 the Lincoln company falsely and fraudulently represented to the complainants that if they would agree to pay $1.50 a month the company would rebuild the entire lines by putting in new poles, a new switchboard at Fairbury and give the best service obtainable, and under these promises the complainants signed such an agreement. It is alleged the company has not fulfilled its promises and is violating contracts made with the Fairbury company by raising the rate from $1.25 a month to $1.50 a month.

June 16: Hearing on application of the Monroe (Neb.) Independent Telephone Co. for permission to issue $55,000 of additional stock and for permission to increase its rates at Albion, Neb.

OHIO.

June 12: The commission authorized the Mt. Sterling Telephone Co., of Mt. Sterling, Ohio, and the receivers of the Central Union Telephone Co. to form a physical connection with their respective plants and systems for the interchange of toll business. Order 865.

OKLAHOMA.

June 13: Hearing in the case of the United Telephone Co., of Afton, vs. the Pioneer Telephone & Telegraph Co., relative to the routing of toll messages, at Oklahoma City.

WASHINGTON.

June 10: Continued hearing at Tacoma on the investigation of the commission into the reasonableness of the rates and charges of the Pacific Telephone & Telegraph Co. in the state of Washington.

WEST VIRGINIA.

June 2: Petition filed by the Wyoming Telephone Co., of Oceana, W. Va., for permission to increase rates.

WISCONSIN.

June 1: Hearing at Linden in the case of F. C. Vogt, et al., vs. the Linden Telephone Co., and the Wisconsin Telephone Co., relative to service and connections. U—927.

June 3: Commission granted the Mazomanie (Wis.) Telephone Co. authority to issue $500 of stock for the purpose of validating void stock outstanding.

June 3: The commission granted authority to the Baldwin (Wis.) Telephone Co. to issue $1,500 in stock to validate void stock and for the purpose of making further extensions.

June 5: Application for a proposed extension was filed by the United Telephone Co., of Monroe, Wis., for the purpose of making a proposed extension in the town of Decatur, Green county. The only company affected is the Broadhead Telephone Co.

June 5: The following applications for telephone extensions were allowed by the Wisconsin Railroad Commission:

Burlington, Brighton & Wheatland Telephone Co., of Burlington, to extend in the town of Burlington, Kenosha county.

Wisconsin Telephone Co. to make extensions in the town of Pleasant Springs, Dane county; the town of Pleasant Prairie, Kenosha county, and the town of Excelsior, Sauk county.

Forestville Telephone Co., Forestville, to extend in the town of Forestville, and the town of Nasewaupee, Door county.

La Valle Telephone Co., of La Valle, to extend in the town of Winfield, Sauk county.

June 6: Hearing in regard to the application of the Necedah Telephone Exchange, of Necedah, Wis., for authority to increase rates. U—934.

June 7: Hearing at Denmark in the case of the Denmark Farmers & Merchants Telephone Co. vs. the Brown Telephone Co., the Wisconsin Telephone Co., and the Wayside Telephone Co., relative to connection and rates. U—908.

June 8: Hearing in regard to the application of the Richard Telephone Co., of Richland Center, Wis., for authority to increase rates. U—943.

June 12: Hearing in the case of the Lancaster Light & Power Co. vs. the Plattsville, Rewey & Ellenboro Telephone Co., relative to inductive interference. U—910.

June 12: Hearing in regard to the application of the Reedsburg (Wis.) Telephone Co. for authority to increase rates. U—949.

June 14: The commission dismissed the application of the Farmers' Telephone Co., of Lancaster, for physical connection with the Wisconsin Telephone Co.

June 14: The Denmark Farmers & Merchants Telephone Co., Brown county, was given connection with the Brown County Telephone Co., and the Wisconsin Telephone Co. and the Wayside Telephone Co., with regulation toll charges.

June 14: The petition of J. S. Roherty and other citizens of Footville against the Footville Telephone Co., asking for an extension of service, was dismissed. The petition of L. H. Howe against the Footville Telephone Co. complaining that there were too many telephones on one line was also dismissed.

June 14: The Peoples' Telephone Co., Mt. Hope, was authorized to raise its annual rate from $8 to $10.

June 15: Hearing at Ladysmith in the case of L. W. Cox, et al., vs. the Arnold Telephone Co. and the Rusk County Telephone Co. U—942.

June 15: Hearing at Grand Rapids in the case of Wm. Nicolaus, et al., vs. the Adams County Metallic Telephone Co. U—939.

June 16: Hearing in regard to the application of the Franksville (Wis.) Telephone Co. for authority to increase rates. U—946.

June 21: Hearing at Milwaukee in the case of Bernard A. Klatt vs. the Wisconsin Telephone Co., on a request for refund. U—950.

June 22: Hearing at Mondovi in regard to the application of the Mondovi Telephone Co. for authority to increase rates. U—888.

June 27: Hearing at Wilton in regard to the application of the Ontario & Wilton Telephone Co. for authority to increase rates. U—936.

6-Point Cheltenham Bold

8-Point Cheltenham Bold

10-Point Cheltenham Bold

12-Point Cheltenham Bold

18-Point Cheltenham Bold

24-Point Cheltenham Bold

36-Point Cheltenham Bold

6-Point Cheltenham Bold Italic

8-Point Cheltenham Bold Italic

10-Point Cheltenham Bold Italic

12-Point Cheltenham Bold Italic

18-Point Cheltenham Bold Italic

24-Point Cheltenham Bold Italic

36-Pt. Cheltenham Bold Italic

6-Point Caslon

8-Point Caslon

10-Point Caslon

12-Point Caslon

18-Point Caslon

24-Point Caslon

36-Point Caslon

6-Point Caslon Bold

8-Point Caslon Bold

10-Point Caslon Bold

12-Point Caslon Bold

18-Point Caslon Bold

24-Point Caslon Bold

36-Point Caslon Bold

6-Point Gothic

8-Point Gothic

10-Point Gothic

12-Point Gothic

18-Point Gothic

24-Point Gothic

36-Point Gothic

6-Point Antique

8-Point Antique

10-Point Antique

12-Point Antique

18-Point Antique

24-Point Antique

36-Point Antique

Table No. 1. Some of the Most Common Type Faces and Sizes Used in Advertisements—Note Differences Between the Various Faces.

Fundamental Principles of the Telephone Business

A Reading Course Designed to Present Logically the Principles Which Underlie Successful Organization and Operation of Telephone Properties—Prepared Under the General Supervision of Stanley R. Edwards—Part I, Telephone Economics, by James H. Shoemaker, Completed June 26, 1915—Part II, The Corporate Telephone Organization, by J. C. Kelsey and S. R. Edwards, Completed September 25, 1915—Part III, Telephone Accounting and Auditing, by James H. Shoemaker, Completed January 15, 1916—Part IV, Telephone Finance, by J. C. Kelsey and S. R. Edwards, Completed June 3, 1916—Installments Now Being Presented Comprise Part V, Telephone Advertising and Publicity, Written by Roy D. Mock

Quiz Questions on the Preceding Installment.

1. What are some of the definitions of advertising?
2. What business virtues are said to constitute advertising? Is merit a form of advertising?
3. Illustrate the value of telling people about an article or a business.
4. What arguments are advanced as to why telephone companies should advertise?
5. What commodity does a telephone company offer for sale? For what purposes should advertising be undertaken?
6. How may the relation of advertising be shown to the telephone business.
7. What opportunity does advertising offer to the telephone manager?

CHAPTER II. Typography.

8. *Differences in Type.*—Since practically all advertising takes a printed form, the question of type is one of the first things to be discussed. Before an effective advertisement can be written, the writer of it must understand the fundamental principles underlying the science of advertising. One of these fundamentals is a knowledge of how to select type, because type is one of the chief tools with which an advertiser works.

	Words in square inch.
18-point (Great Primer), solid	7
14-point (English), solid	10
12-point (Pica), solid	14
12-point (Pica), leaded	11
11-point (Small Pica), solid	17
11-point (Small Pica), leaded	14
10-point (Long Primer), solid	21
10-point (Long Primer), leaded	16
9-point (Bourgeois), solid	26
9-point (Bourgeois), leaded	21
8-point (Brevier), solid	30
8-point (Brevier), leaded	21
7-point (Minion), solid	38
7-point (Minion), leaded	27
6-point (Nonpareil), solid	47
6-point (Nonpareil), leaded	33
5-point (Pearl), solid	69
5-point (Pearl), leaded	50

Table No. 2. Amount of Space Which Different Type Will Occupy.

All type faces are not alike. A complete catalog of type faces would make a book bigger than the unabridged dictionary, yet there are a few faces in common use and which, for the most part, can be found in practically every printing office. For the convenience of TELEPHONY's readers, a few of the commoner type faces, which may be found in practically any printing office, and the most commonly used sizes are shown in Table No. 1 on the opposite page.

9. *Type Sizes.*—Time was when each different size of type had a name, thus you will hear old-style printers referring to "Pica" type or "Minion" or "Nonpareil." But today type sizes are determined entirely by the point system, a point being 1/72nd of an inch.

Size of type.	Number lines set solid.	Number lines leaded with 2-point leads.
5-point	14	10
5½-point (agate)	13	9
6-point	12	9
8-point	9	7
10-point	7	6
12-point	6	5
14-point	5	4
18-point	4	3

Table No. 3. Number of Lines of Type to the Inch.

Thus a 72-point letter will be 1 inch high, and a 6-point piece of type will be 1/12 of an inch in height. This does not mean that the actual printed face occupies that height on the paper, but that the little piece of metal type itself has that dimension.

10. *The Selection of Type for Advertisements.*—One of the first things to learn in selecting type for an advertisement is that as few different faces and sizes of type as possible should be used. The more faces and the more sizes of type used in an advertisement, the more confusing it becomes to the eye. Legibility is always gained by simplicity. For proof of this, note the difference in legibility between the two advertisements reproduced in Figs. 1 and 2.

For ordinary advertising purposes there is no doubt that the most legible face of type that can be used is the "old style." Tests have been conducted to prove that it is easier on the eye and consequently will be read with greater enjoyment than any other face of type. Particularly where an advertisement is long and contains mostly text matter, old style is undoubtedly the preferred type to use, although the display matter should be set in some heavier face such as Cheltenham Bold or Caslon Bold or the italics of these two faces.

11. *Space Type Occupies on a Page.*—In figuring the amount of space a manuscript will fill, the figures in Table No. 2 may

be used. It will be noted that the terms "solid" and "leaded" are used in the table. Leaded, as used in this sense, means with a spacing of 2 points between each line of type.

Where it is desired to find the number of lines to the inch that certain sizes of type will fill, Table No. 3 may be utilized.

Fig. 1. Many Faces and Sizes of Type Confuse the Eye.

12. *Kinds of Cuts Used for Reproducing Photographs and Drawings.*—There are two kinds of cuts or printing plates in common use today—half-tones and zinc etchings. Of these, the half-tone is the most universally used process of reproducing photographs, wash drawings, etc.

Half-tones are made by interposing a screen between the copy and a sensitized photographic plate in a camera. This produces a negative consisting of dots arranged in rows or lines. The negative is then printed on a copper plate and etched with acid.

In ordering half-tones, the dimensions should always be given as well as the screen, the screens being measured by the number of lines to the inch. That is, a 100-line screen half-tone means the negative is taken through a screen which has 100 lines to the inch. The fewer lines to the inch there are, the coarser the screen.

For use in newspapers a 60 or 80-line screen gives best results. For booklets, 120 or 133-line screen half-tones are most generally used.

The different effects produced by differences in screens are shown in Fig. 3. The screen used depends upon the kind of paper used for the printing. In TELEPHONY, the 120-line screen gives slightly better results than the 133-line screen. The coarser screens used in newspapers, as shown, are not adaptable for use in TELEPHONY, while on the other hand the fine screen cuts of TELEPHONY will not reproduce well in newspapers.

13. *Zinc Etchings and Other Kinds of Cuts.*—Zinc etchings are also made by a photographing process in which the copy is placed before the camera and a negative obtained, no screen being used. This negative is printed on a zinc plate which is then etched in an acid bath. The difference between a zinc etching and a half-tone is illustrated by comparing Figs. 3 and 4. Zinc etchings are frequently referred to as "line" cuts owing to their being made from copy produced by means of lines.

Half-tones and zinc etchings being made by a photographic process, cannot usually be obtained from copy in which colors of a bluish tinge appear as the camera will not "take" such colors. If, however, the color will photograph "black," a reproduction can be made.

Another type of printing plate commonly used is an electrotype. This is simply a copy of either a zinc etching or a half-tone. In other words, to secure an electrotype, one must first have either a half-tone or a zinc etching. From this piece of copy, an electrotype can be made which will answer all the purposes of ordinary printing and yet will be cheaper than using original plates. Where a great number of impressions or prints are to be made, it is best to have an electrotype made to be used for the printing.

Wood cuts are seldom used any more, as the metal plates are quicker to make and much more satisfactory. Yet the wood cut used to be the universally accepted type of printing plate.

(To be Continued.)

Get a Telephone of Your Own

In these modern days a telephone is no longer a luxury—it is a necessity.

The family without a telephone is shut off from its neighbors. So far as quick communication is concerned, you might as well be living off by yourself miles away from anyone else. Get a telephone! Order it installed today. The cost is remarkably small—only 5 cents a day—$1.50 a month. Isn't it worth this much simply for the pleasure it will give you to be able to talk to your friends when you want to?

With the telephone in your home, you are always protected. You can summon assistance in case of fire or burglary in your home. The telephone is the greatest protector of life and property that has ever been devised.

And think of the feeling of pride that goes with having a telephone in your home! Our new telephone directory goes to press July 1st. We should like to include your name there. Get in touch with us today and order a telephone installed.

Home Telephone Co.

C. J. Smith, Manager

Fig. 2. Legibility is Always Gained by Simplicity.

The Marshfield (Wis.) Telephone Exchange.

In the "Greater Marshfield Industrial Edition" of The Marshfield Times (of Marshfield, Wis.), issued on April

19, considerable space is given to a history of the organization and progress of the Marshfield Telephone Exchange. This company was organized in 1898 by R. L. Kraus, Karl Doege and W. A. Sexton and commenced operating with some 80 subscribers. In 1902 J. C. Marsh, who is now

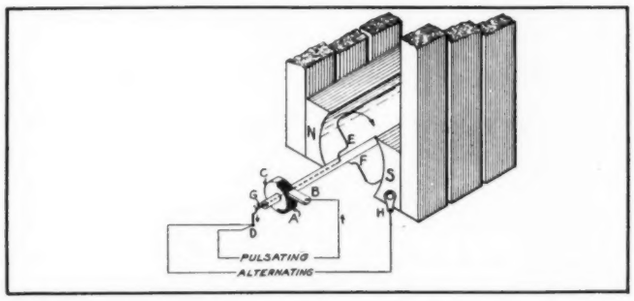


Fig. 4. Illustration Reproduced by Use of a Zinc Etching.

president, purchased all of the stock in the company and for the next nine years operated the plant as an individual. During this period the plant grew from 184 to 501 telephones.

In 1911, Mr. Marsh organized the Marshfield Telephone Exchange, since which time the exchange has been operated as a corporation. In the following year the exchange was completely overhauled and new cables and central office equipment installed. Since that time the subscribers' list has increased to 860, with 500 connecting telephones, free to Marshfield subscribers.

The same issue of The Marshfield Times also contained a full-page advertisement of the Marshfield Telephone Exchange, calling attention to the part which the telephone has played in the progress and advancement of the city of Marshfield.

Meeting of Central Illinois Telephone Association.

The regular monthly meeting of the Central Illinois Telephone Association, was held in Moweaqua, Ill., on Thursday, June 15. A paper was presented by E. W. Hight on "Proper Methods for Prompt Collections," while "The Future of the Telephone in the Country as Regards Rates, Service and Construction," was discussed by O. E. Daggett. "The Cost of Installing Underground Cables in Small Unpaved Towns," was taken up by L. J. Wilie.

The Moweaqua Telephone Co. has just completed the rebuilding of its entire plant and is now installed in its new building. The visitors were given an opportunity to inspect the entire plant, which attracted much favorable attention.

Meeting to Discuss Long Distance Operating Rules.

Representatives from Independent telephone companies of Ohio and western Pennsylvania held a meeting on June 5 and 6 at the Fountain Inn, New Castle, Pa., to discuss the long distance operating rules promulgated by the Ohio State Telephone Co., and adopted by the Western Pennsylvania Independent Telephone Association. More than 20 cities and the following companies were represented: the Union Telephone Co., of Erie; the Enon Valley (Pa.) Telephone Co., the Kennard (Pa.) Telephone & Telegraph Co., and the Peoples Telephone Co., of Butler, Pa.

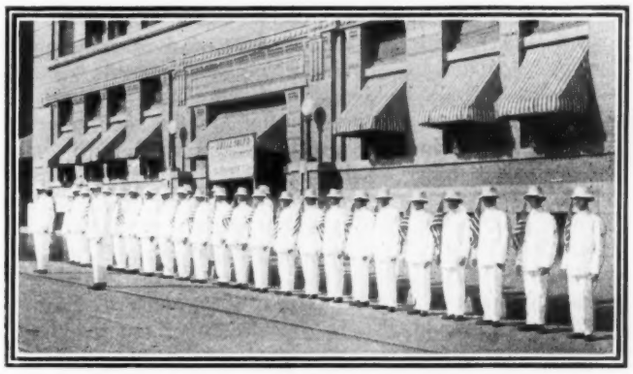
In addition to operators from more than 20 cities, W. H. Wilson, general manager of the Union Telephone Co., of Erie; J. H. Longstreet, district manager from Mercer, and F. R. Hillhouse, district manager at New Castle, were present at the meeting.

New Eight-Story Exchange Planned for Queens, N. Y.

To provide for the large increase in business in the Ridgewood territory, the New York Telephone Co. will erect in that section the largest telephone exchange in Queens, New York. The building will be located at the southwest corner of Gates and Fairview avenues. It will be of brick, 42 by 82 feet, eight stories high, and will cost $150,000.

Dallas (Tex.) Telephone Men in Preparedness Parade.

The drill squad of the Dallas Automatic Telephone Co., of Dallas, Texas, a photograph of which is reproduced below, occasioned much favorable comment in the preparedness parade



Drill Squad of Dallas (Texas) Company in Preparedness Parade.

which took place in Dallas on Wednesday afternoon, May 30.

The men were organized and drilled by Clarence E. Linz, vice-president and secretary of the company. Mr. Linz is a very busy man, but when the preparedness parade was suggested in Dallas, he took time to organize and personally drill 28 young men of the company. With their neat white uniforms and orderly marching, they formed one of the most efficient and attractive marching units in the parade. Although practically all of the firms in the city were represented, the Dallas drill team was the only one whose photograph was reproduced in the newspapers.

There were some 20,000 who participated in the national defense demonstration, which was witnessed by over 100,000 spectators.

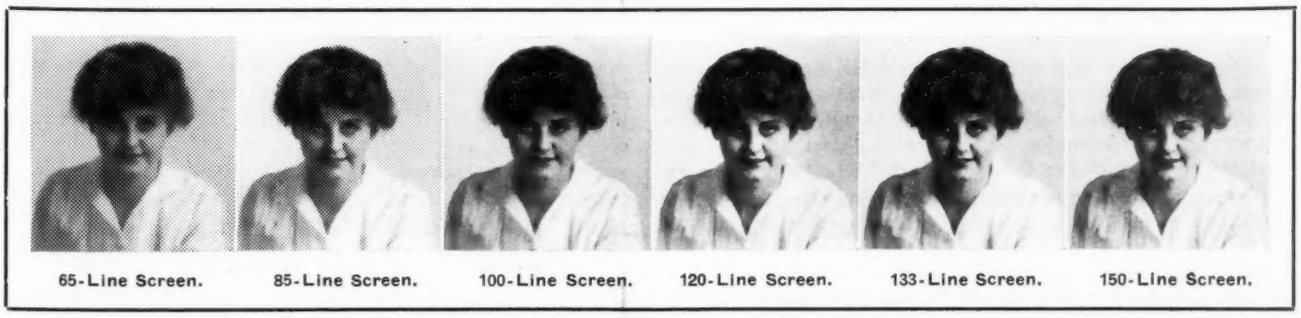


Fig. 3. Differences in Various Screen Half-Tones, the Coarser Screen Half-Tones Are Used With the Coarser Papers.

Simple and Necessary Records for a Local Exchange

Opening a Set of Books and Keeping the Accounts of a Class C Company in Accordance with Requirements of the Interstate Commerce Commission—Paper Presented at Convention of Sixth District of Missouri Independent Telephone Association

By Miss Meddie Hanks

When asked to prepare a paper on this subject, I advanced the argument that no one should undertake to offer suggestions and instructions on a subject in which they were not in every way proficient, and as I had only the smallest knowledge of the subject, and that gained mainly by my own experience, I thought it would be better to leave it to others who were better qualified. However, it was suggested to me that I, with my limited understanding of the matter, might know of difficulties encountered by a beginner, which an expert accountant might not be able to appreciate. So it is with that intention and not because of anything I think I may add to the many excellent articles which have been prepared on the subject, that I shall attempt to outline a few simple and necessary records for a small exchange.

Resources and Liabilities.

A company's accounts are divided under two heads, resources and liabilities. The resources of a concern include everything of actual cash value which belongs to the company, such as cash, lands, buildings, plant and equipment, notes and accounts which are due the company. If the present records of the company do not show the actual value of the plant and equipment in service, it must be gained by taking an inventory.

The liabilities of the company include anything in the nature of a debt which must be paid at some future time, whether in the form of bonds, notes, mortgages, or accounts payable. If an incorporated company, the amount of paid up capital stock should also be included, or if an individually owned concern, the owner's original investment as nearly as can be ascertained.

With such figures as a basis, one is ready to begin. These items are recorded in the book known as the journal. It is in this book that the "double entry" occurs. By double entry is meant that for each amount placed on the debit side of the journal, a corresponding item of the same amount is placed on the credit side. These items being posted to a general ledger, will make the sum of all the debits on the ledger equal the sum of all the credits. The figures which go to make up the resources are all placed on the debit side, and the liabilities on the credit. To make the double entry, when an item is charged, or debited, some account must be credited. In opening, all these amounts may be credited to an account called surplus. The surplus represents the accumulated earnings of the company from the first day of operation. Just as all the amounts which are placed on the debit side are credited to surplus, so all amounts which are credited to liabilities, are debited to surplus.

Now to take up the subject of depreciation. A certain amount of the earnings should be set aside periodically, to cover the estimated decrease in value of the plant owing to wear and tear of equipment. This is usually estimated at a certain percentage of the value of the plant. For instance, if in a plant valued at $30,000 it is estimated that it will depreciate $1,500 a year, an amount shall be set aside monthly, which will cover this $1,500 in a year. Of course this does not mean the actual sum of money is put aside, but that amount is charged against the earnings for that month, and credited to an account called "Reserve for Depreciation."

To take care of the depreciation that may have taken place prior to the opening of the books will necessitate an analysis of the plant value at the time of opening the books, and at the time of construction. Arriving at a figure which will cover the probable depreciation since starting, this amount is made a charge to "Surplus Account" and a credit to "Reserve for Depreciation." At any time during the course of the business certain replacements are made which are judged to be chargeable to depreciation, the cost of such replacements is charged to this reserve for depreciation. When the journal entries are made thus far, the other books are to be taken up.

The Cash Book.

Companies differ as to the handling of the cash books. Some companies combine the cash book with the journal, and make charges and credits to cash, oniy in lump sums, then carry another book called the voucher record to show distribution of cash disbursements. In the set of books explained here, no voucher book is carried, letting the credit side of the cash book show distribution of expense. The amount of cash on hand at the time of opening books is made a charge to cash and a credit to surplus. This amount on hand is entered on the right hand or debit side of the cash book. All cash taken in subsequently is entered here, showing from what source it was received, whether from rental, tolls or miscellaneous sources.

It is advisable to keep a daily cash book to record all payments made by subscribers, and on the cash book proper, make entries only when bank deposits are made. These bank deposits of course are the footings of the daily cash book. On the credit side of the cash book are shown all disbursements. This page is ruled into several columns, a column for the different classes of expense, and a column for ledger accounts, or those which have been charged in the ledger by a journal entry. When a check is issued, the date, check number, name of the party to whom issued, and the amount, are all entered in the spaces provided and each amount is then carried over to the column to which it is to be charged, or if paying off a ledger account, placed under that column.

Most companies make all disbursements by check, but if it is preferred to make small payments in cash, a check is drawn at the first of the month which will be sufficient to cover these minor expenses, and a side account kept as to the distribution of this amount. Each item will of course be charged to its proper expense account, and at the end of the month, or the beginning of the next, another check made, to cover the amount spent. Such distribution of this petty cash account will show on the cash book, or if the cash book is closed before the second check is written, it is carried through the journal. To take care of other expenses which will occur after cash has been closed for the month, but which belong to that month, will require a journal entry, charging the proper account, and crediting the party or firm to whom payment will be made. This will necessitate a few more journal entries than would occur where the voucher system is used, but it has been our experience that practically few accounts come up which are not paid during the month.

Besides the resource and liability accounts, all accounts are either revenue or expense accounts. Each source of revenue is given an account number, as is each class of expense. These numbers are made uniform, as prescribed by the Interstate Commerce Commission under resources, those accounts

which add to the value of the plant and equipment are called "Fixed Capital Accounts." The different classes of fixed capital are also numbered, for example: Account number 220 includes all central office equipment, number 230 station equipment, etc., while under expense, we have, number 600, repairs to wire plant, 610, repairs to equipment. The revenue accounts are numbered: 500 for exchange, or rental revenue, 510, toll revenue. The above numbers apply to companies known as Class C companies.

Fallacies of the Old Accounting Methods.

Under our old system of keeping accounts, we showed by our cash book a record of all money taken in during the month and the money paid out. The former was totaled and counted as our revenue for that month, just as we considered the amount spent to be our expense for that month. A glance would show how misleading a statement of this kind might be. Supposing January collections were very poor, while in February we collected a large amount on back accounts. This would show January revenue much lower than February, while in reality the revenue should have been computed on the amount charged rather than the amount collected. So with disbursements. If an account which was due in January was not paid until February, and then the bills for both months paid at once it would cause the February expense to appear larger.

To take care of this we have what we call our reserve accounts. In the case of taxes, for instance, the year's taxes are usually not paid until December. This would make December expense seem unusually large, yet this is corrected by making each month a charge to expense, and a credit to "Reserve for Taxes." The amount reserved each month can be estimated from a year's taxes for previous years. Each month will, of course, carry one-twelfth of the amount as its portion of the year's tax expense. At the end of the year when the taxes are paid, the check is carried through the cash book, and is posted as a debit to the account "Reserve for Taxes," thus clearing the account.

A telephone company's revenue is principally for exchange and toll service. A ledger, called "Subscribers' Rental and Toll Ledger," carries the name of each subscriber, and each month the proper charges are made for rental and for tolls. A total of the charges for each month will give the revenue for that month. To transfer these amounts to the other books, an entry is made in the journal making a charge to "Rental and Toll Accounts Receivable" and crediting operating revenue. Nos. 500 to 510. As the subscribers' accounts are paid, they are credited to this subscribers' ledger, from the daily cash book. The amount paid by subscribers for rent and toll will agree with the amount shown on the cash book as deposited for rent and toll. From the cash book, the total collected for this account is then posted to the general ledger account as a credit to "Toll and Rental Accounts Receivable."

The expense charges for the month are ascertained, first from the reserve accounts and other journal entries, and then from the footings of the various expense columns in the cash book. When cash is footed at the end of the month, a footing is also made of each of the separate expense columns, thus showing the amount spent for each different class of expense. The means of getting an accurate distribution of the labor expense is found in the foreman's daily work reports. Each day's work is so reported as to show how many hours were spent on each class of labor. The appropriate charges per hour are made later, and these amounts are totaled for the month.

This gives a showing of how much of the wages paid went toward repairs to lines and wires, repairs to telephone equipment, and how much toward additions to the plant. The operators' salaries, general office salaries and other salaries are then included, making a total of the pay roll check for the month, or period of time which the check covers. If this check is paid during the current month, the distribution will show on the cash book. If not paid until after cash is closed, one journal entry will charge the various accounts, and make the total amount a credit to "Pay Roll Account." Then when pay roll is paid, cash will credit this account, thus closing it.

In the matter of handling the material and supplies account, when original inventory is made, the amount of material on hands is counted as a resource, hence charged to an account called "Warehouse" account, and credited to surplus. When new material is purchased it is charged direct to this warehouse account. As this material is used, the foreman, by his work reports, shows the exact disposition of such material, and the value used on the different lines of work—whether for repairs to wire plant, equipment, or fixed capital.

The total of these accounts is made a credit to warehouse account, and a charge to the various accounts for which they were used. Should telephones or equipment be taken down and returned to stock, they are made a charge to warehouse account, and a credit to the fixed capital account from which it was taken. In the matter of new supplies purchased which are known to be for a certain express use, such as poles which are to be put at once into new pole line, or wire for the same purpose, they may be charged at once to their proper account without being taken through the warehouse account.

Posting to the General Ledger.

The journal and cash book are now ready to be posted to the general ledger. This ledger contains a summary of the entries of both the other books. A separate page is opened for each account, and in case of the revenue and expense accounts, it is well, in posting items, to post the account number with the item, which will aid in making up a condensed statement of earnings and expenses. In posting from cash book to ledger, all items on the debit side of cash are posted to the credit side of the ledger, and those on the credit side of cash are posted to the debit side of the ledger. As each different column of expense in cash is totaled, the one amount for each may be posted to ledger. The items under the column headed "Ledger Accounts" on cash, are of course posted to the separate ledger accounts. In posting from the journal, post debits to the debit side of ledger and credits to credit side.

When all items from each book have been posted, the ledger accounts are then footed and the balances written lightly in pencil on the side on which balance occurs. Then the ledger is ready for a trial balance to be taken. This trial balance is merely a summary of all the ledger balances. When the sum of the debit balances equals the sum of the credit balances, the trial balance is correct. If the accounts on the trial balance are listed, a financial statement may then be made from it, listing all the resources, and the liabilities. The revenue and expense accounts will show the gross revenue and expense for the period shown, and the difference between them will show the net gain or loss, as the case may be. This net gain, on the financial statement, is added to the surplus, and goes to make the total of the liabilities equal the total of the resources. But it is added to surplus on the financial statement only, as the expense and revenue accounts are not balanced until the end of the year, or when books are closed. They are then transferred to the surplus by a journal entry.

Of course, there are many smaller details which we could not touch, but these operations, we think, are practically the fundamentals which go toward opening and carrying the accounts for a small telephone company.

Proposal for Municipal System in Los Angeles Fails.

The proposal to issue $8,000,000 in bonds for the establishment of a municipal telephone system in Los Angeles, Cal., which was placed on the ballot at a special election, held June 6, failed, there being a majority against the proposition.

Annual Reports and Meetings of Telephone Companies

Statements Issued by Telephone Companies in Various Parts of the Country Relative to Their Operations During the Past Year—Earnings and Surplus Accounts Show Companies to Be in Excellent Financial Condition—Election of Officers

Report of Manitoba Government Telephones.

The eighth annual report of the Manitoba Government Telephones for the fiscal year ended November 30, 1915, was recently made public. The results obtained, when viewed in the light of existing conditions due to the war, are believed to be the best that could reasonably be expected under the circumstances. The earnings and expenses for the year ended November 30, 1915, compare with the previous year as follows:

COMPARISON OF EARNINGS AND EXPENSES.

	1914.	1915.	Increase.
Revenue:			
Exchange revenue	$1,470,592	$1,394,561	$76,031*
Toll revenue	321,954	333,089	11,135
Sundry net earnings	31,570	41,939	10,369
Total revenue	$1,824,116	$1,769,589	$54,527*
Expenses:			
Operation	$ 619,906	$ 601,077	$18,829*
Current maintenance	315,797	320,839	5,042
Plant replacement	409,536	405,340	4,196*
Taxes	1,127	1,290	163
	$1,346,366	$1,328,546	$17,820*
Net earnings	$ 477,750	$ 441,043	$36,707*
Interest charges	421,682	418,503	3,179*
Surplus	$ 56,068	$ 22,540	$33,528*

*Decrease.

Of the surplus for 1915, $19,646 has been transferred to the replacement trust account, leaving a balance of $2,894 on hand.

The balance sheet for the year ended November 30, 1915, follows:

ASSETS.

	Nov. 30, 1914	Nov. 30, 1915	Increase
Plant	$ 9,897,073	$ 8,843,821	$1,053,252*
Office furniture and fixtures	24,693	25,199	506
Supplies, tools and vehicles	393,888	353,459	40,429*
Cash and deposits	112,177	120,420	8,243
Replacement trust account	731,515	326,161	405,354*
Accounts receivable	99,751	69,607	30,144*
Prepaid expense	1,851	15,548	13,697
Investment securities	.....	1,000,000	1,000,000
Intangible capital	.....	1,138,568	1,138,568
	$11,260,948	$11,892,783	$ 631,835

LIABILITIES.

Government investment	$10,386,026	$10,661,026	$ 275,000
Accounts payable	36,093	47,455	11,362
Unearned revenue	80,146	73,839	6,307*
Replacement reserves	753,046	1,101,932	348,886
Provincial treasurer's accounts	5,637	8,531	2,894
Total liabilities	$11,260,948	$11,892,783	$ 631,835

*Decrease.

At the beginning of the year 1915, the government had in its replacement trust account an unexpended balance, $731,515, of which amount $725,000, in addition to $275,000 capital moneys, totaling $1,000,000 was, upon the approval of the public utilities commission, invested in five-year five per cent. gold bonds of the Province of Manitoba.

On November 30, 1915, there were 44,717 telephones in service in the province, representing a loss of 1,832 over the previous year. Of that number the city of Winnipeg had 24,122 telephones.

A continuous system of testing the subscribers' service, both in Winnipeg and provincial exchanges, was maintained throughout the year. Sixty-five provincial exchanges and all of the Winnipeg exchanges were visited for this purpose and tested once every month during the period, making a total of 8,000 tests.

An accurate record was maintained throughout the period of complaints received from subscribers in regard to the quality of the service rendered. The results of these records are tabulated below:

	Winnipeg Exchange.	Provincial Exchange.
Average operators' answer	2.40	6.18 seconds.
Average time to complete connection	20.30	23.00 seconds.
Average time to disconnect	2.20	6.50 seconds.
Total subscribers' complaints per annum	264.00	143.00
Average percentage of subscribers' complaints	.08	1.00
Average calls per line per day	11.40	5.80
Average number completed calls		
Number of tests of service	7,200.00	800.00
per day	209,369.00	132,379.00

New Ulm (Minn.) Company to Make Improvements.

At the annual meeting of the New Ulm (Minn.) Rural Telephone Co. directors were elected for the ensuing year as follows:

Fred Pfaender, F. H. Retzlaff, H. P. Bastian, Ad. G. Bierbaum, Wm. James and Jos. Wiesner, of New Ulm; Jos. J. Sperl and Herman Fritsche, of Cottonwood; Wm. Gluth and Fred Rolloff, of Milford; J. A. Sellner and H. A. Hillesheim, of Siegel; N. Reinhart and Hy. Mueller, of Courtland; Alex. Russell and L. P. Bushard, of West Newton; Fred Wellner and John Huelskamp, of Lafayette.

At a subsequent meeting of the new directors, officers for the coming year were elected. They are: President, Fred Pfaender; vice-president, Alex. Russell; secretary, F. H. Retzlaff; assistant secretary, A. G. Bierbaum; treasurer, Wm. James; manager, Otto Kohn.

The financial statement presented by Assistant Secretary A. G. Bierbaum showed that the company has no indebtedness and that the assets now total $80,752, which includes $2,737 cash on hand, and $9,500 in 11 certificates of deposit, the balance being construction, equipment and real estate. The liabilities of the company consist of $61,450 capital stock, $4,302 in the dividend account and $15,000 in undivided profits. Since the organization of the company in 1905 the sum of $40,784 has been charged off for depreciation.

Report of New Brunswick Telephone Co.

The annual report of the New Brunswick Telephone Co., New Brunswick, Canada, shows a gain of 912 telephones and an increase of $9,500 in annual toll receipts for the fiscal year ended March 31, 1916. Other features noted in the report are the increase of from 50 to 100 per cent. in the cost of wire, cables and hardware, and scarcity of labor on account of enlistments in the army. The assets are reported as $1,980,515 and surplus $24,737. The gross revenue was $482,287, from which operating expenses and depreciation were deducted, $364,676, leaving a net revenue of $117,611. Dividends paid during the year amounted to $100,764, and the capital stock was $1,259,540.

Report of Philippine Islands Company.

The Philippine Islands Telephone & Telegraph Co., of Manila, Philippine Islands, reports that total assets increased from $904,331 to $935,597 during the past year.

Directors chosen at the annual meeting which was held recently, were: F. W. Eaton, Louis Glass, Charles J. Deering, S. Waldo Coleman and A. B. Cooper. Louis Glass was re-elected president and H. W. Smith, secertary.

Bell System Reports Gain in Earnings.

According to figures recently made public, the total operating revenues of the Bell telephone system in the United States for the month of April, 1916, showed an increase of 10.22 per cent. over April, 1915. For the first four months of the year operating revenues were 11.71 per cent. greater than in the corresponding four months of last year.

A comparison of the April operating income with that of April, 1915, follows:

	April.	Increase.
Exchange revenues	$15,479,833	$1,476,496
Toll revenues	5,669,166	480,176
Miscellaneous revenues	220,456	23,657
Total operating revenues	$21,369,455	$1,980,329
Depreciation	3,982,019	341,389
Current maintenance	2,753,610	250,896
Traffic expenses	4,230,052	550,280
Commercial expenses	2,104,526	125,066
General and miscellaneous expenses	892,031	*46,510
Total operating expenses	$13,962,238	$1,221,121
Net operating revenues	7,407,217	759,208
Uncollected revenues	133,373	*4,588
Taxes	1,163,305	100,494
Operating income	$ 6,110,539	†$ 663,302

*Decrease. †Equal to 12.18 per cent.

A comparison of the income for the four months ended April 30 with the corresponding period in 1915, follows:

	Four months.	Increase.
Exchange revenues	$60,874,924	$5,583,647
Toll revenues	22,010,920	2,652,889
Miscellaneous revenues	867,931	120,528
Total operating revenues	$83,753,775	$8,357,064
Depreciation	15,582,853	1,320,210
Current maintenance	10,500,748	869,420
Traffic expenses	16,638,302	2,146,370
Commercial expenses	8,307,502	483,741
General and miscellanous expenses	3,655,684	*3,261
Total operating expenses	$54,685,089	$4,816,480
Net operating revenues	29,068,686	3,540,584
Uncollected revenues	545,516	*10,896
Taxes	4,664,140	374,706
Operating income	$23,859,030	†$3,176,774

*Decrease. †Equal to 15.36 per cent.

To Connect Chicago and Joliet by Underground Cables.

The Chicago Telephone Co. has a force of men at work digging trenches preparatory to laying conduit for connecting Joliet and Chicago by means of underground wires —a distance of approximately 35 miles. The route of the underground conduit will be from Joliet to Lockport and from there to Willow Springs, skirting the edge of Lemont to the south, on the way. A spur will supply wires to Lemont. From Willow Springs there will be a short aerial cable to Western Springs, the only section of the line that will not be in conduit. From Western Springs the cable will be brought to Chicago in the underground system through LaGrange and Berwyn. There will be 175 circuits in the cables between Chicago and Joliet.

Practical Subjects—Letters and Discussions

A Case Where He Tied the Knot.

A few days ago we received a call from the proprietor of the store where 843-K was located, telling us that we could not get the exchange over his telephone. The line read O. K. but we were unable to raise the subscriber. When the inspector arrived at the store, he asked the proprietor what trouble he was having with his telephone.

"You go back and try him. The bell, he rings all right, but I no hear anybody on the line and the girl, she makes no answer."

So the inspector proceeded to the rear of the little store where he found the bell box on the side of the wall and the pedestal on a little shelf above the bell box. At one end of the shelf was the side of a bin which had been erected the day before. Testing, he found that the trouble showed toward the pedestal. While putting in another cord with which to test, as the old one had been run through the side of the bin, the subscriber said:

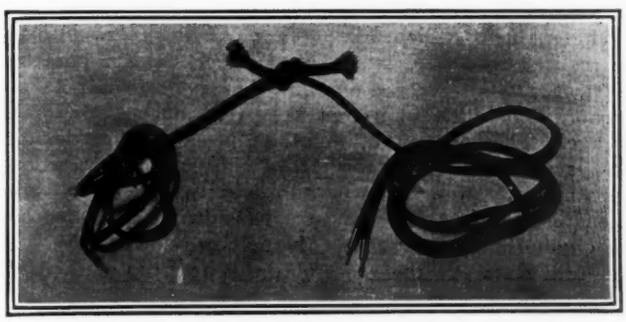
"I want you to leave him back through them boards. I put him there yesterday."

"All right, I will when I find out where the trouble is," replied the inspector.

After having placed the new cord he found the trouble was in the old one. He took hold of one end to pull it out but it did not come. Trying the other, he met with the same result. So he went around where he could reach into the bin. Reaching in he pulled the cord out and found it knotted as shown in the accompanying photograph.

The groceryman had cut the cord, put the ends through the hole and tied them together inside the bin—then he wondered why he could not get the exchange. To him, the pedestal cord was merely a piece of woven string and ought to work if it were cut and the ends tied together.

A surprising fact concerning this case of trouble was the attitude of ignorance of the public in regard to the cord. The young man who made the photograph showed



The Grocer Cut the Cord and Tied Ends Together.

the cord to several of his acquaintances and nearly every one could not see why the telephone should not work with the cord having the cut ends tied together.

J. W. Hache.

She's a Good Business Woman.

What would you do, Miss Pay Station Operator, if a man had used your station for a $12.45 long distance talk and only had one dollar with which to pay? That is a question asked and answered in a recent issue of the Southwestern Telephone News. Bertha Roeder, pay station attendant at the Union Station, Kansas City, faced this

difficult situation and collected all the money due the company.

The other day a traveler walked up to Miss Roeder's desk and asked her to place a call for a certain party in St. Louis.

"You talked 31 minutes," she told the man when he had finished his talk, "and that makes the toll charges $12.45.

"I have just one dollar in money on my person with which to pay this bill," he replied in nonchalant tones.

"Have you any articles of value about you that you could leave for security for the toll charges?" asked the quick-witted and astute operator.

"Not a thing," replied the man, with cheerful frankness.

"No jewelry, watch or baggage?"

"No, ma'am, nothing but my railroad ticket to San Francisco."

The little pucker between Miss Roeder's brows vanished and her eye brightened. Here was a way to collect from a man who seemed to be judgment proof. "Your railroad ticket," she said, "that is just the thing. It has a value of more than the toll charges. You leave the ticket with me for security until you can pay for your call."

The young woman spoke decisively and stretched forth her hand for the ticket as a matter of course. The psychology of her manner won. The man surrendered his three thousand miles of railroad transportation without any resistance and went away. It was to be observed, however, that he had lost some of his gay indifference to the obligations that society imposes upon its members.

The next day this man appeared again upon the scene. He counted down before Miss Roeder the sum of $12.45 and received his railroad ticket back again.

Automobile Changes Distribution Work.

The increasing popularity of the automobile, made possible by the reduction in price, has brought about a condition which is causing our company considerable trouble and expense in connection with the maintenance of its outside plant in several of the large cities, says R. W. Prince, in The Transmitter, Baltimore. This is particularly true in Washington, where the wide alleys in many of the blocks make it possible for owners of automobiles to construct garages in the rear of their property.

The extent to which this practice is being followed may be realized when it is stated that scarcely a day goes by that we do not receive a request to relocate a pole or anchor guy which interferes with the construction of a garage. The location of poles on property lines is not always a solution of the trouble, because strong representations made by property owners to the city authorities very often result in the telephone company being requested by the city authorities to remove the pole or relocate it.

A few years ago the short pole or circle top method of distribution was considered ideal under certain conditions. It seems to be doubtful, however, whether this method of distribution will be as desirable in the future as it has been in the past, because of the difficulty in maintaining the original pole locations.

The Washington division is anticipating future conditions, and by the judicious use of "block work" is removing the source of the trouble. The practice is to install a cable with terminals at frequent intervals under the porches of the houses at the time they are constructed, securing from the builder the necessary permit, and at the same time constructing the wire run which is necessary.

No trouble has been experienced with property owners due to the presence of the cable and wires on their houses, doubtless because they recognize the fact that the pole construction is less desirable from the standpoint of "The City Beautiful" than the block system. This is particularly true when it is realized that the present practice in the construction of city houses is to do away with the old board type of fence and substitute for it the open or sanitary type of fence construction.

"Telephony's" Home Course for Telephone Men.

(Not meant for study.)

By Well Clay.

In your search for golden treasure
That is sunken in the sea,
Or buried deep by pirates
Who have won it desperately;
As you scale the rugged mountains
In your search for hidden store,
Or delve deep in the mysteries
Of the chemist's written lore;
As you're straining every effort
To win Dame Fortune's smile,
Don't overlook the golden treasures
Which surround you all the while.

While you're waiting for the riches
Which you hope will come to you,
Ere you start to take enjoyment
In the things you plan to do;
While you put off for the future
All the dictates of your heart,
And wait to get the riches
Before you ever make a start;
While you're slaving with ambition
To lay aside a goodly pile,
Don't forget to taste the honey
Which surrounds you all the while.

While you're toiling on the treadmill
Of your bitter daily grind,
Led on by false delusion that
In great wealth you will find
The only road to comfort
And a pleasant green old age;
Stopping not to read the message
Written on the daily page;
'Til your hopes have turned to ashes
And your heart is like a file;
Wouldn't it be lots better
If you loved some one meanwhile?

While you strive to paint the picture
That will win undying fame,
And sacrifice the best in life
To the glory of a name;
Or you build with bricks and mortar
A structure to the skies,
And never note the beauty
Of the earth which underlies;
Wouldn't you feel lots better,
In case the scheme went wrong,
To feel you'd had the pleasures
Which were handy all along?

Get all you can out of life in the way of good legitimate enjoyment, as you go along, and don't wait for that "fishing trip" until you get independently rich. Now that I think of it, I have never met many very wealthy old men out fishing anyhow. Must be they are doing something else since they "got" theirs—watching it, perhaps, to keep it growing and to see that none of it gets away.

I do not mean that you should neglect your business to yank the reluctant fish from its moist environment, but that you should aim to think ahead and plan and work to such good advantage that there will be time to both work and play. Even a dry battery will increase its output by a little rest once in a while; so why shouldn't a telephone man?

People, who assume to know, say that after the war in Europe is over there is to be another war, which is to spread over this country as well as the others. It will be an industrial war in which we will all be forced to enlist and fight for our financial lives—a war in which, like the war in the European countries, Old Man Efficiency is going to be the commanding

officer on the "Board of Strategy," regardless of who wears the medals and sports the shoulder straps.

To be efficient in the best sense, one must work in such a way that the desired end is reached in the best, easiest and quickest manner. To labor thus, one must not only have knowledge of his work and training to properly carry it on but must learn to conserve his energy at opportune times, by rest.

Rest does not mean necessarily the entire cessation of bodily action coupled with the mind being in a state of coma. It may mean the engaging in some other interesting occupation or pastime aside from the regular daily grind. Some like to fish, some to play golf, while some think the height of pleasure is only gained in close proximity to a pool table.

There are many ways, however, in which a telephone man can have a lot of real pleasure, even while he is emulating the busy bee by passing from trouble to trouble, instead of from flower to flower. There are few occupations in the rural districts which give followers more chances that are to be desired in the way of mingling with everybody, of seeing the inside of every home, of knowing the varying excellence of the cooks of most of the households, and of meeting each household under its own roof, than that of a telephone man.

Sometimes I have wondered if we wouldn't, at least, have as much fun as now if we were to remember oftener to take along a little fruit for Bill Jones, whom we know is flat on his back for a week's attack of lagrippe, or a book to the lady of some house whom we know is recovering from a broken limb. Perhaps the little girl who lost her hand in a mowing machine would like some little trinket, or some old grandmother, sitting by the fire, would be more than pleased if we were to stop a minute, as we passed in to fix the telephone, to inquire about her son John, who left the farm for the big city and who sometimes fails to write often.

Wouldn't it be productive of quite a lot of pleasure if we were to think oftener of that other side of our patron's mind than the popularly accepted fiction that he is spending all his time with the receiver to his ear "rubbering"? Every time we start out on a trip we have in mind the routes over which we must travel and the people we will meet and, generally speaking, the chances we have for "shooting trouble."

Leaving out of the matter the aspect of doing the other fellow some good, wouldn't it pay any troubleman to do some of these things, if for no other reason that the fact that good fellowship tends to eliminate lots of nasty "kicks"? A patron naturally hates to be mean to you if you have been pretty decent to him or his folks.

Instead of keeping the mind frozen tight to the physical troubles along the line, why not branch out and include a few problems in human nature? See if you cannot take out a few "shorts", strengthen up a few "weaks" and eliminate a few "grounds" for complaint against the seeming indifference which seems to exist at times between us and the world?

Let us not look longingly over all the nearby opportunities, to fix our eyes on some distant goal. It may seemingly have all the colors of the rainbow of happiness, but it is liable to turn out to be merely a mist of uncertainty, reflecting the rays of hope into the prismatic colors of anticipated joy. Let us first examine carefully all the possibilities for real fun and satisfactory enjoyment that exist in our own jobs, and drink in the beauty of the rose which we hold in our hand, rather than to be always yearning for the grand panorama of the snow-clad, sun-kissed heights which we may never have a chance to see.

APHORISM: A fish in the boat is worth ten in the lake.

Lieutenant Greely and His Patent Insulator.

A good story is told in the Telegraph and Telephone Age, of the experiences of the late General A. W. Greely, at one time chief of the signal corps, U. S. A., with a patent telegraph insulator.

Lieutenant Greely—he was plain lieutenant then—went to Texas in November, 1875, to build a telegraph line to San Antonio from Fort Brown. He had an insulator which he and other experts had gotten up in Washington especially for this line. It consisted of a well-lacquered sheet-iron cap over a dry wood screw and had the general appearance, when in position, of a tomato can on the end of a broomstick.

The line was built 400 miles and for two weeks or a month worked like a dream. Suddenly warm weather set in, and when warm weather strikes lower Rio Grande, it takes hold for keeps. The thermometer crawled up to 100, and after several weeks of this spell the line began to get mysterious kinks in it. There was trouble somewhere and plenty of it. The line was not down, but it seemed to have its grip on all through messages. San Antonio had to do all its business with Fort Brown by relaying at Laredo. In a few days Laredo could only telegraph as far as Ringgold Barracks, south, or to Fort Clark, north, and through messages from San Antonio to Fort Brown had to stop off three times en route for a rest.

At the end of the week, the trouble was worse, and Lieutenant Greely sent couriers galloping down the whole circuit. They could not find a place where the wire was down or in contact with trees or with anything else, but they reported something queer with the "insulators." Lieutenant Greely was wild with indignant surprise. The idea of an insulator going wrong which had been concocted in Washington especially for Texas!

Still the telegraph line was not working any better as a telegraph line than as a fish line, or a clothes line, so he borrowed a mule from a quartermaster and started out to investigate. He came back in light marching order that evening with a sad secret in his heart, several lumps on his countenance, and minus the wayward army mule.

The simple truth was that the Texas hornets, which are lazy beasts, thought the new insulators were a shelter kindly provided by the government for their special use. So they had gone to work and filled every blessed one of them from San Antonio down with mud, sour honey and general cussedness, and the line was literally 400 miles of Hades in active eruption. Lieutenant Greely wrote to Washington experts, who promptly got a new breed of insulators, solid as a brick and burglar proof. They were shipped and Lieutenant Greely induced a gang of unsuspecting linemen to sign a cast-iron contract to take the old insulators off.

The "repairing" party left Fort Brown on April 10. By this time the hornets had raised an uproarious family in each insulator, and the first lineman who shinned up to serve the writ of ejectment got a dose of trouble that made his hair curl. In his haste down, he let the pole slip up through his hands, burning them, besides taking all the buttons off his clothes. The way the hornets expressed their opinion of signal service hospitality was sinful. It cost 46 able-bodied men, 19 barrels of bread poultice, and a cask of refined arnica to "repair" the first eight miles, and then operations ceased.

When the linemen got so they could see well enough out of one eye to shoot, they went gunning for Lieutenant Greely, but he had already fled the state in a blue fog, and the next thing heard of him was that he had barricaded himself somewere in the neighborhood of the North Pole.

The line remained in an inactive and war-like status until winter, and telegrams were forwarded by the aid of a slow but persevering mule. After the first blizzard had calmed the hornet families into solid lumps, the contractor resumed his labors and recouped his loss by shipping the insulators to Baltimore for canning clams, and seven dozen crates of assorted stings to England for sale as sewing machine needles.

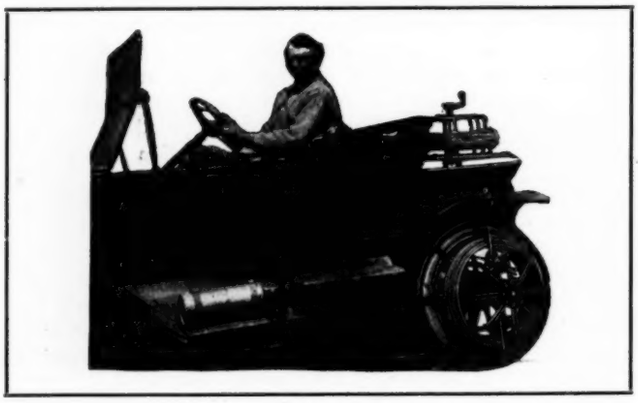
Consolidation of Local Companies at Oakville, Iowa.

The Oakville Mutual Telephone Co., of Oakville, Iowa, has purchased the property of the Oakville Telephone Co. for $11,000 and will consolidate the systems.

From Factory and Salesroom

The Auto Pay-Out and Take-Up Reel.

The auto reel shown in the accompanying illustration may be used as a pay-out or take-up reel, and it may be converted into a hand reel in less than two minutes. As a power take-up reel, it is attached to the rear wheel of an automobile or motor truck of any make. It is said that it



The Auto Reel in Operation.

will not scratch or mar the wheel and can be attached in a few minutes without any tools. The car is "jacked up" so that the reel clears the ground several inches, and a block is placed under the other rear wheel so that the machine will not move.

The wire to be reeled is passed through the guide, which is on the running board directly below the driver's seat, and fastened to the auto reel. After starting the motor, it should be kept in first or second speed.

The guide is operated by the driver so that the wire is evenly distributed over the reel. This guide is an important feature, as it is so constructed that the splicing in the wire passes through it without the holder losing its grip on the wire, thus insuring tight, smoothly wound wire.

It is said that over half a mile of wire can be wound in less than 10 minutes into one smooth and solid bale in this manner and can be removed from the reel by pulling out the rod that is held near the top by a spring. It is not necessary to remove the reel.

By attaching a handle, it can be changed into a hand reel in a few minutes. When used as a pay-out reel, the specially designed spring tension prevents the wire from paying out too readily.

With the use of the auto reel, old wire can be replaced by new wire and the old wire wound in one operation, mechanicaly. The method of procedure is as follows: Untie the old wire, leaving it lay on the cross arms. Splice one end of the old wire to a pay-out reel of new wire. Fasten the other end of the old wire to the auto reel attached to the automobile and the wire is reeled up and replaced by new wire, mechanically, in one operation. This feature is said to be worth the price of the reel alone.

The reel is simple in construction and is manufactured of angle and channel steel, making it light and very strong. Patents have been applied for. The reel will be sent on 10 days' free trial by its manufacturer, the Auto Reel Mfg. Co., Liberty, Mo.

Dixon Home Telephone Co. Builds New Exchange.

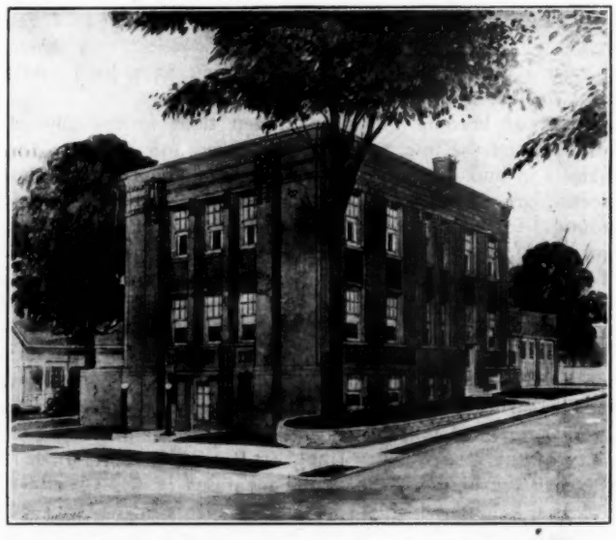
The history of the Dixon Home Telephone Co. dates back to 1896 when L. D. Pitcher, the successful organizer of several Illinois Independent telephone companies, promoted and built a network of lines throughout Lee county and centered them at Dixon, Ill. This system was incorporated as the Lee County Telephone Co., and continued as such until 1905 when the plant outside of Dixon was disposed of to several smaller operating companies and the Dixon plant reorganized as the Dixon Home Telephone Co.

Two of the first moves made by the progressive management that took hold of the Dixon property were the reconstruction of the lines and the equipment of the general office with Stromberg-Carlson apparatus. After seven years of keen competition with the opposition company, the Dixon Home Telephone Co. listed 2,000 local subscribers' stations against 100 operated by the opposition.

The Bell company realized the hopeless situation in 1912 and sold out to the Dixon company which promptly dismantled the plant and took over the long distance lines. On January 15, 1916, the exchange building and its contents were destroyed by fire from which one operator barely escaped with her life. Service was resumed two weeks later through the use of a Western Electric emergency switchboad installed in temporary exchange quarters.

The accompanying illustration shows the pleasing exterior of the new exchange building now under construction, which was designed by N. Max Dunning, one of the leading architects of the Middle West. The building will be faced with tapestry brick, shading from red to a dark brown and trimmed with dark red terra cotta. The floor plans were determined after a painstaking study of many other exchange buildings recently constructed.

The main entrance in front admits to a lobby in the basement which contains several pay-station booths; also to the stairs leading to the main floor on which the commercial office, manager's and directors' rooms will be located. A side entrance is provided for the employes which permits them to gain entrance to any department without going through any other department. The terminal room



New Exchange Building of Dixon (Ill.) Home Telephone Co.

is located on the main floor and connects with the garage in the rear. The second floor is given over entirely to the operating room, rest room, kitchenette, shower baths, etc. No feature conducive to high efficiency service has been omitted in the design of this up-to-date exchange building.

On May 1, a contract was made with the Stromberg-

Carlson Telephone Mfg. Co. for the complete equipment for the new exchange. The contract calls for a central energy multiple switchboard consisting of a cable-turning section and four three-position switchboard sections having an ultimate multiple capacity for 4,800 lines.

The line equipments will be of the usual standard type, equipped with both answering and multiple jacks, except that a concentrated line lamp multiple will be installed above the multiple jacks in positions Nos. 5 and 9 inclusive. The first position will contain the out-of-order cords, hospital cords, wire chief's trunks, etc. The second and third positions will serve as rural line positions equipped with 70 drop signal line equipments and universal cord pair equipments arranged for double lamp supervision, four-party machine ringing, flashing recall and automatic peg count.

Among the semi-special features to be included in the local operator's cord circuit equipments are: Four-party machine ringing, operator's cut-in and cut-off, listening pilot lamp, flashing recall and automatic service meter. Provision will be made in these circuits so that the calling subscriber will hear a uniform ringing tone for all four frequencies while waiting for the called party to respond.

The main battery plant will consist of eleven type F-17 storage cells equipped with F-11 elements, also two sets of toll booster batteries each consisting of eleven type P. T. cells. Direct current for charging the battery equipment will be supplied by duplicate 50-ampere type mercury arc rectifiers. The power board, which will be combined with the fuse board, will contain all facilities for handling this equipment, also the harmonic converters and interrupter sets.

A toll board consisting of two standard Stromberg-Carlson two-position sections will handle a present equipment of 50 lamp signal toll lines and will connect with the main board by means of 30 service trunks and 10 recording trunks.

The auxiliary desks to be furnished under the contract, include a wire chief's desk, chief operator's desk and a combination recording and information desk. The manager's office will be equipped with a monitoring set containing operator's listening taps, multiple line, listening and supervisory pilot lamps and miscellaneous private and observation lines.

At present the Dixon Home Telephone Co. serves over 2,500 subscribers—nearly one-third of the total population of the city. The officers of the corporation are:

President, J. C. Flowers, who is also president and general manager of the Premier Motor Corporation of Indianapolis; vice-president, E. N. Howell, also president of the Howell Hardware Co., of Dixon; secretary, C. B. Cheadle, secretary of 14 other telephone companies in Illinois and Iowa; treasurer, W. C. Durkes, president of the City National Bank, Dixon. The managing director is Louis D. Pitcher, who has just completed 20 years of service with the Dixon Home Telephone Co. and its predecessor.

Kellogg Bakelite Receivers Meet with Favor.

A group of telephone men were engaged in conversation in a Chicago hotel last week. Of these men three were delegates to the national conventions of the Republican and Progressive parties and two Kellogg representatives.

"I was looking over my maintenance records of the past twelve months," said one man, "and one outstanding feature made me certain that I have been the gainer by what I consider the biggest improvement in telephony of the past year; and that's the Kellogg Bakelite receiver."

"They have saved me a lot of money, I know," said a second member of the group. "Nearly every set in our exchange is now of that type and we have the least trouble we have ever had in this part of the telephone business. They are universally liked by subscribers too, do not change color or shape, are graceful in design, odorless and retain a high polish."

"The interest in Kellogg Bakelite receiver shell equipment is indicated by the number of requests for information concerning it," joined in one of the Kellogg representatives. "We have almost entirely exhausted our edition of 10,000 receiver booklets and are now distributing a little pamphlet covering special operator's equipment. The company is, of course, sending these booklets to interested telephone men on request, as well as distributing them in other ways."

The Dare Cryptophone.

A device, claimed to accomplish the essential purposes of a telephone booth, takes the form of an attachment to the mouthpiece of a transmitter and is known as the Dare Cryptophone. It is contended that this device prevents the voice of a party telephoning, from being heard by others in the same room and that it aids in the hearing, when a person is listening, by keeping confused sounds or other noises from the telephone transmitter.

The Dare Cryptophone.

The instrument consists essentially of a diaphragm mounted in a casing which is locked to the brim of the ordinary transmitter mouthpiece by means of a thumbscrew. The diaphragm is said to be balanced to unisonance with the transmitter diaphragm which it vibrates synchronously without contacts when impulses are received by it. It is claimed that this Cryptophone diaphragm is more sensitive than the transmitter diaphragm, as it is damped only by spring means to keep it in position and carries no load.

The casing of the Cryptophone is in the form of a resonator, and the lightiy positioned diaphragm converts it into a sensitized resonator which, it is claimed, collects sound from a distance a third greater than the conventional transmitter diaphragm. The breath of the speaker, it is stated, is exhausted and dissipated in a uniform way so that it cannot strike the transmitter diaphragm and thus transmit breath sounds instead of voice sounds.

As shown in the accompanying illustration, the Cryptophone, when locked by a thumbscrew to the transmitter casing, forms a closed casing which terminates at the transmitter diaphragm. This casing has but one opening or air gap. When the telephone user speaks close into the Cryptophone, the voice vibrations are thrown against the diaphragm of the device and passed to the transmitter diaphragm as a vibratory motion. The breath accompanying the voice of the user, is liberated from the device through the air gap which extends laterally away from the user's face.

This escaping breath or air is stated to cause a confusion of air current and thus destroys the continuity of the speech so that the voice is not heard coherently by a person at one side of the instrument. It is claimed that extraneous sounds or noises will not enter the Cryptophone and therefore the noise of typewriting machines and other noises in an office or factory are kept from the transmitter diaphragm.

There are said to be many of these Cryptophones in service in Philadelphia, Pa., where the instrument is sold by Dr. Arthur Dare, 2035 Chestnut street, and from whom full information may be obtained.